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63-3-2

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AN APPROACH TO THE STUDY
OF
SOCIAL AND PSYCHOLOGICAL EFFECTS
OF
NUCLEAR ATTACK

March 1963

Prepared by
Human Sciences Research, Inc.

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for
The Office of Civil Defense
Department of Defense
on
Contract OCD-OS-62-62



human sciences research inc

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Office of Civil Defense
Review Notice

This report has been reviewed by the Office of Civil Defense and approved for publication. The objective of the study was the ordering and systematizing of the OCD research effort and program requirements in the area of social and psychological aspects of the vulnerability of American society to nuclear attack. Thus, the study is primarily a research planning effort and approval of the report does not signify that the contents necessarily reflect the views and policies of the Office of Civil Defense.

FOREWORD

The present volume is the major report prepared on a study of social and psychological effects of nuclear war being conducted by Human Sciences Research, Inc., under contract to the Office of Civil Defense, Department of Defense. This report incorporates many of the products of research effort over the past year and has been prepared with the intent of serving an orienting function for researchers interested in performing research on post-attack phenomena.

The overall study is an organized research effort, employing the knowledges and skills of psychologists, sociologists, anthropologists, economists, historians, mathematicians, and political scientists. The total effort is designed to draw together the findings and methods of the behavioral science disciplines for the purpose of making a unified set of projections about social life in American society following massive thermonuclear attack. From such projections of the likely post-war world, systematic inferences are being drawn about the capabilities and vulnerabilities of the American society and the implications these may have for the short and long run recovery of society and for the planning and development of civil defense countermeasures. Thus, parallel with the effort being made by others to assess the physical damage and the physical resources remaining after a nuclear attack, this study has as its goal the determination of the "social resources" and the "social requirements" which civil defense planners must use and meet in mobilizing Americans to behave coherently before, during, and for a long time after a massive thermonuclear attack.

At the present stage of the study, the primary effort is aimed at ordering and structuring the research needs in this area to provide a systematic perspective within which the total set of problems can be conceived and organized. The practical goal of this project is to present

such information to civil defense planners in a way which will be useful to them in assessing these needs for research on post-attack behavioral phenomena and in developing research projects on such phenomena which are likely to yield results of maximum value for the planning and development of civil defense countermeasure systems designed to enhance the capability of the society to survive and recover from a nuclear attack. An important corollary objective of the study is to serve as a catalyst to further a greater interest and participation in research in this problem area by qualified behavioral scientists.

The research effort is divided into four distinguishable tasks.

1. Description of requirements for research on behavior in the post-attack situation.

In this task the attempt is being made to describe research studies on behavior in the post-attack situation whose results would appear to have potentially significant implications for the design and implementation of civil defense countermeasures. There are two parts of this task: (a) to develop a conceptual framework for organizing and integrating the requirements for research on behavior in the post-attack situation, and (b) to identify and describe a set of specific studies designed to fulfill the requirements. Developments on this task are related in Chapters III and IV.

2. Conduct of specific studies.

Under this task is included the actual conduct of a number of the studies identified. Some of these are in-house efforts, but the majority are being conducted by subcontracts to a number of Universities. Examples of the studies currently being conducted are:

- a. Possible pressures toward migration following massive attack
- b. Learning and motivational requirements for individuals facing large scale disaster
- c. Enduring and debilitating effects of fear following a nuclear attack

- d. The family in the post-nuclear attack world
- e. Cooperative versus competitive behavior in the emergence period

A separate report is being produced on each study and will appear in a series of topical reports currently in preparation.

3. Development of appropriate methodology for post-attack behavioral research.

In this task, considerable effort is being directed at resolving some of the serious methodological problems which confront a researcher when he tries to carry out studies of the nature described above. One objective of this task is to develop suitable methodology for conducting the required research. A separate report has been prepared on this subject.¹

4. Development of an orientation for researchers investigating social and psychological effects of nuclear attack.

One product of the work on the project is the present document which is intended to provide an orientation to the total problem area of civil defense needs for research on post-attack behavioral phenomena. This monograph is conceived as a point of departure in developing the means of applying the scientific method to the problem of estimating social and psychological effects of an attack and the subsequent implications of those effects for societal recovery.

¹Mowshowitz, A. The Foundations of Post-Attack Behavioral Research. Arlington, Va.: Human Sciences Research, Inc., March 1963. (HSR-RR-63/4-Rr, Contract OCD-OS-62-62)

ACKNOWLEDGEMENTS

This document exists because of the combined and concerted effort of all the members of the research team who have shown their willingness to ask the hard questions and to dare to be creative in an area almost totally lacking in precedent or guidelines.

It is difficult to be precise about the authorship of a document of this type for it is really the joint product of a research team; its contents have been developed through conferences, seminars, dialogues, and a general exchange of ideas throughout the year. A complete listing of contributions is impossible, but an indication of major responsibilities for different parts of the report can be given.

Bruce C. Allnutt - was largely responsible for the creation of Chapter VI, Physical Effects of Nuclear Explosions, and for the development, in collaboration with James Bruning and Peter G. Nordlie, of the concept of the Standard Situational Case described in Chapter V.

Carol L. Mudd - was largely responsible for assembling the materials in Appendix A, Brief Organizational History of Civil Defense in the United States.

Joel W. Novak - assisted in the development of the organization of the report with particular responsibility, together with Bruce C. Allnutt and Peter G. Nordlie, for Part II.

Seymour D. Vestermark, Jr. - was responsible for the creation and preparation of the major substantive developments of the report described in Chapter III, The Development of a First-order Research Program on Possible Social Effects of Massive Attack, and Chapter IV, Proposed First-order Research Studies on Possible Social Effects of Massive Attack.

Peter G. Nordlie - was the editor for the entire report, contributed Chapters I and II, and was one of the three collaborators in the development of the concept of the Standard Situational Case (Chapter V).

It has been our good fortune to have as project monitor from the Office of Civil Defense, Mr. Ralph Garrett whose singular dedication and perserverance in the task of providing, through research, the bases for making civil defense more effective, have served as an inspiration to all of those who have worked with him. Throughout our project, he has stimulated us to face the challenges and uncertanties of behavioral science research in this area. He has done this through his overriding dedication to the belief that through detached behavioral science research, civil defense must be, inevitably, more effective and more relevant to the realities of human society. For his consistent commitment to the ideals of impartial science, for his awareness of the difficulties of facing many great unknowns, and for his respect for the freedom which men who live by science must have, we acknowledge our debt to Ralph Garrett.

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PART I

**THE INVESTIGATION OF SOCIAL AND PSYCHOLOGICAL
EFFECTS OF NUCLEAR WAR**

CHAPTER I. INTRODUCTION

This report has been prepared for The Office of Civil Defense to help formulate a planning basis for relevant research on the social and psychological effects of nuclear war. It is also intended to be useful to behavioral scientists interested in research on the same subject for it contains a collection of materials the researcher may find helpful as background information, sources of data and hypotheses, and as an orientation toward research on behavioral phenomena in post-attack situations.

Background

Nuclear war is an idea which, as yet, can only be imperfectly imagined--an idea so overwhelming in its implications that it taxes human comprehension. Even among those whose task it is to study nuclear war, no one has yet advanced the claim that he can begin to comprehend the totality of the events implied by a massive nuclear attack. Its enormity, its complexity, its unknown quantities, and its ubiquitous effect on all man's affairs, understandably have led to the clothing of the whole idea in debate and controversy.

The purpose of this research program is not to enter the debate on the grounds on which it is currently being waged, but rather, it is to seek ways of clarifying some of the critical issues inherent in it by formulating and attempting to answer some of the fundamental questions as systematically and objectively as the scientific means available will allow. Basically, ways are being sought of thinking meaningfully about the likely effects of a nuclear war on a society. A language and a set of concepts are needed to aid in making such effects accessible to scientific inquiry. In addition, a clear understanding of the nature of the destructive agents under consideration is required. Ultimately, the goal is the formu-

lation of if..., then... propositions about post-attack behavioral events in which the if clauses specify sets of situational determinants and the then clauses specify certain predicted behavioral outcomes which appear likely on the basis of available evidence.

Often, to begin at the beginning, one must start with an apparently self-evident proposition. In this case, it seems appropriate to start by granting that a nuclear war is possible. If its possibility is not granted, then there is no need for further concern--either with preventing it or with ameliorating its effects, should it come. Neither would there be cause for anxiety nor alarm, nor a basis for the fears that have motivated people to concern themselves with nuclear war. Granting the possibility does not imply desiring it, accepting it, or minimizing its potential consequences; it simply is a recognition of a reality of our existence.¹

The possibility of a nuclear war is not a theoretical speculation--a fantasy spun out of non-existent yarn--nor does it depend upon the development of capabilities not yet in being. The possibility has existed for several years, it exists now, and it would appear likely to continue to exist in the foreseeable future. The capabilities for waging a nuclear war are realities, and no guarantee exists that these capabilities will not be used. Nuclear war, therefore, is more than an idea; it is a starkly real possibility.

¹The counterview, frequently appearing in the literature, appears to hold that such recognition is not so much an intellectual or cognitive act as it is a moral issue. The logic often runs that acceptance of the possibility eventually leads to morally untenable positions such as support of a pre-emptive strike or creation of a super-garrison state. Some argue, in fact, that merely talking about the possibility of nuclear war makes it more probable. Such argument appears flawed because serious concern for arms control or disarmament also requires acceptance of the possibility of nuclear war. If disarmament and pre-emptive strike can be considered the two extremes of some continuum of alternative courses of action and both require acceptance of the possibility, can one not reasonably argue that there are neither logically nor psychologically necessary consequences of the acceptance of the possibility of nuclear war?

Its actual occurrence would not depend upon some single and simple event, but rather upon the simultaneous or ordered occurrence of a whole array of events and conditions at both national and international levels. There is debate upon the exact nature of the events and conditions and the likelihood of their joint occurrence, but none of them are outside the realm of possibility. Willed or not willed; accidental or planned; unexpected or anticipated; a nuclear war may occur.

Widespread recognition of the possibility of its occurrence has led to varied responses in our own society. Among these are the proliferation of peace movements, the establishment of a national Arms Control and Disarmament Agency, the establishment of a Civil Defense Organization, the open advocacy of a pre-emptive strike, the development of an ever-growing literature on all aspects of nuclear war, and an apparent relatively widespread heightened concern throughout the population.

Nuclear war has a democratic characteristic--it threatens all in about the same way. It is not, therefore, the special concern or province of some particular sector of our society, but a real concern of the entire society. This undoubtedly accounts for involvement of people of all descriptions in the varied responses to the perceived threat, and no doubt it is the awesome magnitude of the threat which has led to the high emotional involvement which tends to accompany discussion of nearly every aspect of nuclear war and to which almost any participant in the discussion finds himself subject (the writers not excluded). The debates, with their highly emotional character and their frequent failure to distinguish what are fundamentally differences in values (not amenable to resolution by reference to objectively observable phenomena), have contributed additional fuel to already brightly burning controversies. But, they have done little to illuminate sensible paths of action to follow for people as individuals and the nation as a whole.

To be understood, an endeavor like the present research effort must be appraised in the light of the fundamental assumptions in which it is grounded. There is no way for the inherent controversial issues to be resolved in this research effort, but it is possible to make explicit the assumptions underlying the research and the perspective from which it is being undertaken. In this problem area, where value judgments and questions of morality confound any formulation of the problems, it is of special importance that certain sets of basic assumptions are explicitly articulated. For these reasons, some pains have been taken to make clear the assumptions about civil defense and about the conception of the needs for behavioral research on post-attack phenomena on which this work is based.

Civil Defense as a Response to the Recognized Threat of War

We understand civil defense, in all its aspects, to be one of many responses the social system has made to the recognition of the possibility of nuclear war. The establishment of the Office of Civil Defense and related state and local organizations is viewed as the institutionalization of the perceived need for an organization whose objective is to determine and implement the most effective means for insuring the continued existence of the American social system in the event of a nuclear attack. It is important that it be clearly understood that these--and not others--are the assumptions on which the work reported here was based.

Our research effort is conceived and understood as the active participation in one of society's responses to the threat of nuclear war. Participation in this effort is in no way inimical to the desire and hope for avoidance of the

event being assumed for purposes of research. The civil defense response, itself, is not necessarily inconsistent or incompatible with other responses, such as increased efforts for arms control, or strengthening our military capabilities because deterrence may fail and arms control efforts may be unsuccessful.

The Functions of Civil Defense in American Society

Another category of assumptions underlying the research endeavor concerns the functions we attribute to the civil defense effort in the United States. We take as assumptions that the objectives of the Office of Civil Defense are: (1) to protect as large a portion of the United States as is possible in the event of an attack, (2) to enhance the ability of the society to survive and recover from an attack, should that ever be necessary.

The objectives of present day civil defense go far beyond those of civilian defense efforts in World War II. Civil defense, today, is concerned not only with protecting as many lives as possible, but more significantly, it is charged with the responsibility of finding the means of preserving and insuring the ultimate recovery, in the event of an attack, of those essential ingredients which constitute the American social system. Ultimately, there is but one issue in civil defense--the American people--and, like all other components of the United States government, the Office of Civil Defense has one basic objective--to ensure the well-being of the American people. This aim requires an understanding of the basic elements of the structure and functioning of our own social system, and it implies the development of means to decrease its vulnerabilities to a nuclear attack and enhance its capabilities for rebuilding a severely damaged society. It is in this sense that civil defense must mean far more than the building of warning systems and the provision of shelter against radiation.

The Office of Civil Defense performs at least two different functions in carrying out these objectives. First, it must create the means for implementing them. This function has sometimes been termed the "building" function analogous, in part, to the manufacture of tools and dies for subsequent use in a particular manufacturing process. Second, often referred to as the "operational" function, is the actual operating of civil defense systems in pre-attack, attack, and post-attack situations. The primary concern of civil defense has been, and is now, the "building" of effective operational civil defense systems. This building function has two foci of activities. One is the actual creation of systems which policy makers have decided are to be part of the civil defense operational system. This activity is exemplified currently by the national shelter program which entails the surveying, marking, and stocking of public fallout shelters across the country. The other focus of activity is the research and development necessary to provide policy makers with the information base upon which to build additional countermeasures² and to increase the effectiveness of existing ones. The present research is one element in this second focus of activities.

Rationale for Research on Post-attack Phenomena

The ultimate objective of all civil defense programs is to increase the likelihood of societal recovery should a nuclear attack ever come. It is in this light that the major criterion for the selection of any proposed countermeasure lies in its estimated effect on societal recovery. This means that the effects of any countermeasure must be estimated by considering what its influence is likely to be in a future post-attack situation. Such estimates require not only an extensive set of assumptions for which evidence is minimal and uncertain, to say the least, but also an understanding of the dynamic functioning of social systems which lies beyond the capabilities

²The term countermeasure is used in its broadest sense to include any hardware, procedure, plan, provision, or action designed to reduce the effects of an attack and enhance recovery capabilities.

of the present state-of-knowledge. To the extent that such assumptions are incomplete and inaccurate, the countermeasures based on them are less likely to be effective and consequently, the capabilities for societal recovery would be reduced. Civil defense policy makers and planners have great need for more complete and accurate estimates concerning a wide variety of post-attack phenomena.

Rationale for Behavioral Research on Post-attack Phenomena

It has long been obvious that the well-being of the survivors of an attack and their capability for recovery will depend, in part, on the extent of physical damage to industrial facilities, commercial plants, transportation, communications, etc. Not so immediately obvious is that recovery of the society will depend also on the ways in which human behavior would be affected by the attack. As yet, far less is known about the likely effects of an attack on individual behavior patterns and on the social system as a whole than is known about the strictly physical effects of an attack. Nonetheless, it is necessarily true that any civil defense planning or countermeasure system must be based on certain assumptions about human behavior in the post-attack situation whether those assumptions are recognized or not. To the extent that these assumptions are erroneous, the planned programs will be less likely to fulfill the purposes for which they were intended. In addition to the need for such information in the planning of effective countermeasures, another highly significant reason underlies the requirement for research on behavior in the post-attack situation. Specifically, there is the need to understand the ways in which recovery planning could aid in preserving the essential democratic processes and values of the American system, and in ensuring that the civil defense countermeasures instituted would not destroy the very elements of American society they are designed to protect and preserve. In sum, there are logically necessary and compelling reasons for conducting research on social and psychological phenomena in a post-attack situation.

It is unquestionably more difficult to predict survivors' behavior than the state of physical resources after any specific hypothetical attack, but both are equally important if civil defense programs are to be realistically designed for operation in the post-attack period.

When the available knowledge relevant to civil defense planning is reviewed, it becomes clear that a great deal is known about the physical effects of nuclear weapons; an accumulation of knowledge exists concerning the physical aspects of radiation and blast protection; a body of information is developing on physical and non-physical aspects of warning systems; and a growing collection of techniques for damage assessment is being developed. However, there is no such body of knowledge concerning the likely social and psychological effects of an attack and the implications these effects have for societal recovery--no hard information for the policy maker to consider. Individuals and communities have been studied under disaster conditions; there exists a considerable literature on psychological reactions to stress; and the response of organizations to various kinds of stress has been investigated. But few attempts have been made to generalize knowledge in these fields to the conditions expected to exist in post-attack situations, and such efforts are of vital importance for effective civil defense planning. We find instead, that the relevant questions are just beginning to be formulated and the realization that civil defense is primarily a matter of influencing human behavior is beginning to crystalize.³

³ Support for this view may be found in testimony by Secretary Pittman in recent congressional hearings that:

"...the civil defense system proposed by the President cannot be run like a military command, and it is not a hardware system; it is directed primarily at people and human relations." (emphasis supplied) (325)

Such a view in no way de-emphasizes the necessity and importance of shelters and the other physical components of an effective civil defense program, but it does provide perspective on heretofore relatively neglected elements of civil defense planning.

It is, then, from these assumptions about the nature, objectives, and functions of civil defense that the present research endeavor has proceeded. Although perhaps all of these premises are debatable, our intent has been not to present a case for them, but rather only to make them as explicit as possible in the hope that for better or for worse, the research effort can be more clearly understood for what it is.

Purpose and Scope of this Monograph

The behavioral research needs relevant to civil defense planning confront the researcher with a disordered array of questions, possible studies, problem areas, hypotheses, demands for evidence, and unresolved methodological and value issues. Enmeshed in this diverse collection of research needs are countless theoretical empirical and methodological problems of central importance to the interests of behavioral scientists of all backgrounds and disciplines. These research problems clearly exist in their own right quite independently of their critical import for national policy and of the practical and applied civil defense needs which focus attention upon them. The fact that such research may have important applied uses does not alter the theoretical significance of the research to the mainstreams of the behavioral sciences. Because of the complexity of the total problem area and because its applied characteristics have tended to obscure the theoretical significance of the needed research, this monograph has been created in response to the recognition of a need for articulation of a perspective or general orientation to the total problem area, which, hopefully, would help stimulate a more systematic and objective concern for research on behavioral phenomena in post-attack situations. Furthermore, as more behavioral scientists become involved with research related to civil defense needs, a

need is created for some orientation or guide to the relevant literature available in the field--concerning both the behavioral sciences and the basic characteristics of and phenomena associated with nuclear weapons. This monograph, therefore, is conceived as a point of departure in developing the means of applying the scientific method to problems of social and psychological effects of an attack and to the subsequent implications of those effects for societal recovery. It is designed to fulfill manifold purposes. Foremost, it represents an effort to provide an orientation to the total problem area of civil defense needs for research on post-attack behavioral phenomena--a perspective from which diverse questions can be meaningfully formulated and researched. It is, therefore, an attempt to delineate the means of approaching the problem area objectively, systematically, and empirically. Secondly, it is intended to serve as a guide to the voluminous relevant literature. Furthermore, because it is unlikely that much meaningful behavioral research could be accomplished without a specific understanding of the characteristics of the post-attack environment in which people would live, it is also intended to assist the behavioral scientist in familiarizing himself with the specific alterations in the environment likely to result from a nuclear attack.

The writers are not unaware of the presumptuousness of their attempt to launch a frontal attack on this entire problem area. Hopefully, the product will be understood as a beginning, which at the very least, may serve the heuristic function of stimulating others to improve upon it or replace it with a different more useful perspective.

The chapters in this report, which stand almost independently of each other, are a collection of materials intended to be useful to a researcher contemplating initiation of research on this problem area. Following the introductory chapter, Part I begins with a chapter designed to furnish a guide to

relevant source materials and to provide an overview of the different kinds of material available. This chapter is accompanied by a categorized, selected bibliography.

The third chapter develops a conceptual organization of post-attack behavioral research needs.

In the fourth chapter, a number of specific studies which appear critical are described.

In the fifth chapter, a concept is developed and described which is believed likely to have key significance as a tool for research on post-attack behavioral phenomena.

Part II deals with physical effects of nuclear weapons. The first chapter describes the effects of a nuclear bomb considered as a single explosion, and the second chapter considers such effects when they occur in a nationwide attack.

Appendix A provides a brief organizational history of civil defense in the United States. A glossary of terms related to nuclear war is presented in Appendix B.

CHAPTER II. A BRIEF GUIDE TO SOURCE MATERIALS RELEVANT TO RESEARCH ON BEHAVIORAL PHENOMENA IN A POST-ATTACK SITUATION

Most of the available source materials pertinent to the study of behavioral phenomena in a post-attack situation are, at best, tangentially relevant. Nonetheless, in the initiation of research in any new problem area, a starting point must be established in the present state-of-knowledge in potentially related areas. The purpose of this chapter, in conjunction with the accompanying bibliography, is to provide an overview of, and a guide to, the kinds of source materials which appear relevant to the general problem area. The chapter consists largely of descriptions of a number of source materials and comments upon the characteristics of the materials to be found within categories. The bibliography is classified into the same categories.

Categorization of Source Materials

Almost everything is partially relevant and almost nothing is entirely relevant to the problem area. The categories used are based upon a particular conception of the information needs a researcher would have in addressing the specific research questions of the kind outlined in Chapter IV. This conception involves four major assumptions:

1. The ultimate objective of the research formulated and conducted in this program is to provide more objective data and inferences on which to base effective civil defense programs and specific countermeasures.
2. The criterion for any civil defense program or countermeasure is its predicted effect on societal recovery. (The implication of this assumption is the necessity for taking a total society frame of reference.)

3. The research must be able to make projections or predictions about behavior--at the individual, group, organization, and society levels--for a variety of situations produced by the combination of a range of possible attack effects with the varied existing pre-attack situations.
4. Ultimately, it must be possible to relate specific projections and predictions to particular hypothetical attack patterns.

The selection of items in the bibliography and of the particular categories into which they were classified was based on this conception of the objectives and characteristics of the research in question.

The objective was to provide a bibliography of source materials which would be useful to researchers studying a wide variety of post-attack behavioral phenomena. A major distinction was made between material which dealt with behavioral phenomena and material concerned with other features of the total situation, i.e. nuclear weapons effects, civil defense, etc. Within the former broad category, Behavioral Data Sources, a rather severe restriction was imposed in view of the fact that almost any research finding or theoretical formulation in any of the behavioral sciences can be said to be related to the general problem area, and in a strict sense, that would be true. In view of this fact, bibliographic coverage was restricted to those materials which deal directly with human behavior under disaster conditions or under conditions of severe stress.¹

The second broad category, Relevant Related Sources, by its nature is impossible to define by precise selection criteria. Materials included

¹This selection criterion has been relaxed for theoretical materials concerned with societal or social system structure and function. The high relevance of such materials was felt to justify their inclusions.

are those considered useful either as general background material or as descriptive of the environment in which post-attack living is likely to occur.

As is always the case, any attempt to categorize source materials runs afoul of the cross-classification problem, i.e. many items contain material pertinent to more than one category. While this is probably true of the majority of the items in the bibliography, especially those in the second main category, no attempt at cross reference has been made. Instead, a forced-choice judgment on each item as a whole was made to decide which of the available categories most appropriately described the item.

The categories of source materials used in this compilation are as follows.

Behavioral Data Sources

- 1.1 Disaster field studies
- 1.2 Inventories and bibliographies of research related to disaster or behavior under stress
- 1.3 Books, articles, summaries, and reviews based on studies of disaster or behavior under stress
- 1.4 Eyewitness and historical accounts of disasters
- 1.5 Field, laboratory, simulation, and historical studies of individuals and groups under stress
- 1.6 Studies, theoretical materials, and source materials on societal functioning and effects of disaster on social structure
- 1.7 Public opinion, knowledge, attitudes, and communications

Relevant Related Sources

- 2.1 Nuclear weapons effects
- 2.2 Economic studies related to recovery
- 2.3 Background material on the strategy of nuclear war and the environment of non-military defense
- 2.4 Civil defense

Categories and Characteristics of Materials Within Each

Behavioral Data Sources

1.1 Disaster field studies (See page 38 in bibliography)

This category includes empirical field studies of behavior before, during, and after particular disaster events. Human behavior in disaster situations represents a comparatively new empirical research interest in the behavioral sciences. Of the studies of 103 disaster events inventoried in 1961 by the National Academy of Sciences (35)², over 90% of them were events which occurred in the preceding 15 years. There is considerable variation in the scope of the different studies and in the magnitude and kinds of disasters studied ranging all the way from an airplane crash in a community to the bombing of Germany in World War II. The different disaster studies are differentially useful depending upon the particular purposes of a researcher. However, five of them might be singled out as representing major research endeavors, each containing a wide variety of empirical data on comparatively major disaster events.

²Numbers in parenthesis refer to number of the referenced item in the bibliography at the end of the chapter.

- (1) Clifford, R. A. The Rio Grande flood: A comparative study of border communities in disaster. Washington, D. C.: National Academy of Sciences-National Research Council, 1956.
- (2) a. Institute for Social Research in the Netherlands. Studies in Holland flood disaster 1953. Vol. I. Communications in the stricken area in February 1953. Amsterdam: Author, 1955.
b. Institute for Social Research in the Netherlands. Studies in Holland flood disaster 1953. Vol. II. Survey of evacuation problems and disaster experiences. Amsterdam: Author, 1955.
c. Institute for Social Research in the Netherlands. Studies in Holland flood disaster 1953. Vol. III. Community studies. Amsterdam: Author, 1955.
d. Institute for Social Research in the Netherlands. Studies in Holland flood disaster 1953. Vol. IV. General Conclusions. Amsterdam: Author, 1955.
- (3) Logan, L., et al. Study of the effect of catastrophe on social disorganization. Chevy Chase, Md.: The Johns Hopkins University, Operations Research Office, 1950. (ORO-T-194)
- (4) Moore, H. E. Tornadoes over Texas. A study of Waco and San Angelo in disaster. Austin, Texas: University of Texas Press, 1958.
- (5) Perry, Helen S., & Perry, S. E. The schoolhouse disasters. Washington, D. C.: National Academy of Sciences-National Research Council, 1959.

A summary picture of the disaster studies available is reproduced in Table I from an inventory of field studies of disaster behavior by the Disaster Research Group of the National Academy of Sciences-National Research Council (35).

The set of disaster field studies are probably the best single source of relevant behavioral data. When used as a basis for attempting to generalize

Table II-1*

SUMMARY OF DISASTER FIELD STUDIES

<u>Disaster agents</u>		<u>Events studied</u>	<u>Field studies</u>	<u>Interviews and questionnaires</u>	<u>Reports</u>
A.	Airplanes	4	3	176	7
B.	Blizzards	3	2	19	2
C.	Earthquakes, etc.	8	8	1,831 ^a	10
D.	Epidemics and Epidemic Threats	5	5	2,487	7
E.	Explosions and Fires	13	13	678 ^a	11
F.	False Alerts	6	7	2,953 ^a	7
G.	Floods	12	16	3,319 ^a	27
H.	Hurricanes and Typhoons	12	9	364 ^a	9
I.	Mine Disasters	2	3	297	5
J.	Tornadoes	20	31	2,092 ^a	34
K.	Toxicological Substances	8	8	227 ^a	6
L.	World War II Bombings	4	6	7,163	4
M.	Miscellaneous	<u>6</u>	<u>3</u>	<u>18</u>	<u>4</u>
	Totals	103	114	21,624 ^a	121 ^b

^a Approximate number

^b Inasmuch as 12 reports appeared in more than one category, the column total represents the total number of different reports.

*Note: Table II-1 taken from bibliographic reference 35, p. 64.

to nuclear attack effects, however, a number of characteristics and limitations of these studies should be considered. It should be understood that the following remarks are not criticisms of these studies, qua studies, but rather an indication of their limitations as data sources for present purposes.

As indicated earlier, the disaster studies as a group are relatively time-bound, almost all of them conducted in the past twenty years. This characteristic coupled with the fact that they tend to be one-time studies--i.e. data is collected during only one time interval--severely restricts the kinds of generalizations one can make about the effects of disasters over time. The studies tend to illuminate immediate individual reactions to disaster events, but shed much less light on the events or situations preceding the disaster or the longer run impact of the disaster on social structure and functioning. It is data of the latter kind which would be of particular value for problems of societal recovery from a nuclear attack.

Another important limitation of the studies, as a group, is that with exception of the World War II bombing surveys, the event studied is generally a disaster which occurs at a relatively small point within an otherwise intact and unaffected society. Characteristic of such disasters is that aid in all forms tends to pour in from the surrounding areas. However, in considering the likely effects of a nation wide attack directly affecting a large proportion of the populated land area of the nation, it is of special interest to consider likely effects at local levels when no aid is forthcoming from the surrounding areas.

Another significant problem which decreases the usefulness of the disaster studies for present purposes is that each study tends to have been conducted independently of the others, each employing a somewhat different

approach, frame of reference, and focus of interest. There has existed no common framework or set of concepts which would enable one to interrelate the results of different studies. There has been no specification of the parameters of a disaster situation or common agreement on specifically what constitutes a disaster. This situation makes it exceedingly difficult to integrate the findings.

Perhaps, the most serious limitation of the disaster studies for present purposes is simply the fact that none of them are studies of a nation wide disaster produced by a nuclear attack. No means exist for stating the ways or extent to which the conditions of the disasters studies are similar to or different from the conditions which would be produced by a nuclear attack. Furthermore, the absence of any commonly understood conceptualization of disaster phenomena makes it impossible to state these similarities and differences in any formal sense. It is this fact which makes hazardous the extrapolation from disaster research findings to a nuclear disaster situation.

These, then, are some of the characteristics and limitations of the disaster field studies when used as data sources for projecting the likely social and psychological effects of a nuclear attack. There exist over one hundred disaster field studies of which thirty two appear in category 1.1 in the bibliography.

1.2 Inventories and bibliographies of research related to disaster or behavior under stress (See page 40 in bibliography)

Including the one contained in the present report, there are at least six bibliographies or inventories which researchers concerned with post-attack behavioral phenomena may find useful.

A. Field Studies of Disaster Behavior. An Inventory. Disaster Study Number 14. Disaster Research Group. National Academy of Sciences-National Research Council, Washington, D. C.

This inventory provides the most useful entree into field studies of disaster. It inventories 121 reports from 114 studies of 103 disaster events. A listing of related laboratory studies and a listing of civil defense exercises which have been conducted are also included.

The inventory classifies studies by type of disaster agent, i. e. floods, earthquakes, tornadoes, etc. (a total of 13 different agents). For each disaster event, the following information is reported:

- (1) date
- (2) location
- (3) damage
- (4) number of interviews
- (5) research agency and principle research personnel
- (6) reports and references

A summary of the studies in this inventory was presented above in Table I, page 18.

B. Lybrand, W. A. & Popper, R. D. An inventory of selected source materials relevant to integration of physical and social effects of air attack. Arlington, Va.: Human Sciences Research, Inc., 1960.

This inventory contains abstracts or annotations of 212 items covering a wide spectrum of content areas classified into three broad categories:

- (1) The Problem - materials focusing on varying aspects of the effects of, or recovery after, a thermonuclear attack.
- (2) Societal Behavior Under Stress - materials describing societal, group, and individual reactions to World War II bombings and large scale disasters, including small group and individual survival studies.

- (3) **Analytic Methods - materials dealing with analytic model development and application, and with other potentially useful analytic methods.**

For books or long reports, an abstract technique was used and for shorter materials a standardized annotated form was employed. The annotation form permitted the description of each item in the following categories:

Summary
Statement of Study Problems
Research Approach
Key Concepts
Discussion
Conclusions and/or Recommendations

This inventory duplicates many items in the National Academy of Sciences-National Research Council (NAS-NRC) inventory, but the annotations provide additional information not contained in the NAS-NRC inventory. Many researchers have reported that this annotated inventory is useful in deciding whether or not to investigate further an item which by its title alone appears relevant. One bothersome inadequacy of this inventory is the lack of an index which would provide ready access to its contents.

- C. Sells, S. B. Military small group performance under isolation and stress. An annotated bibliography. Fort Wainwright, Alaska: Arctic Aeromedical Laboratory, 1961 (Project 8243-11).

This annotated bibliography consists of a set of 11 separate documents. For each of the 6 categories listed below an annotated bibliography was prepared.

- I. The Basic Psychology of Group Behavior (37)
- II. Dimensions of Group Structure and Group Behavior (38)
- III. Environmental Stress and Behavior Ecology (39)

IV. Organizational Staffing (40)

V. Organizational Management and Leadership (41)

VI. Leadership in Formal Groups (42)

Based on the material in these bibliographies, five critical reviews were published with the following titles:

- I. Information, Natural Groups: Development, Structure and Function (108)**
- II. Dimensions of Group Structure and Group Behavior (109)**
- III. Environmental Stress and Behavior Ecology (110)**
- IV. Organizational Staffing (111)**
- V. Psychological Principles of Management and Leadership (112)**

These publications were produced on a study of factors related to the effectiveness of Aircraft Control and Warning sites in Alaska. They were undertaken from a rather broad frame of reference, however, and much of the material has relevance to a wide variety of related problems. Approximately 400 items are annotated in the six separate bibliographies.

D. Biderman, A. D., et al. A selected bibliography on captivity behavior. Washington, D. C.: Air Force Office of Scientific Research, 1961.

This bibliography of 630 items was produced on a study of the implications for the social sciences of studies of prisoners of war, political prisoners, concentration camp prisoners, and civilian internees. The bibliography is intended to provide comprehensive coverage of scientific and scholarly material relating to American prisoners of war in Korea. It also includes studies of earlier events as well as illustrative, autobiographical, journalistic, and propagandistic accounts.

The bibliography is organized into three categories:

- (1) Scientific and Scholarly Works
- (2) Governmental and Institutional Sources
- (3) Other Works

E. Applezweig, M. H. Psychological stress and related concepts: A bibliography. New London, Conn.: Connecticut College, 1957.

This is a very comprehensive bibliography--over 2,600 items--of studies dealing with stress and the related concepts of anxiety, ego-involvement, frustration, breakdown, conflict, tension, fatigue, excessive stimulation, understimulation, extremeness of deprivation or environmental condition, pressure, emotional conditioning, etc. The items are organized alphabetically by author and are not divided into categories. Many of the pre-1957 field disaster studies contained in the NAS-NRC inventory are included, but mainly, this bibliography is focused on studies of psychological stress as it has been studied in the mainstreams of psychology. For present purposes, its focus is very diffuse, but its breadth of coverage makes it useful.

F. Bibliography in this Chapter

This bibliography has been developed specifically for the assistance of researchers studying various aspects of the likely social and psychological effects of nuclear war. The categories under which the items are organized have been given on pages 15 and 16. This organization is an attempt to provide an overview of the kinds of source materials available. It includes, therefore, not only sources concerned with behavior in disaster but also such background materials as materials on nuclear war, civil defense, and the effects of nuclear weapons. Within categories, it is selective rather than comprehensive; the selection was made from the perspective stated at

the beginning of this chapter. Any researcher interested in a particular problem area will have need to go far beyond the range of source materials in this bibliography, but it is hoped that it will provide a useful starting point for a variety of research tasks.

1.3 Books, articles, summaries, and reviews, based on studies of disaster or behavior under stress (See page 41 in bibliography)

There is a growing literature based primarily on the findings of the disaster studies. In addition, increasing numbers of articles in journals and reports are appearing which focus on particular phenomena associated with disaster--such as panic--and on methodological issues in disaster research. There have been a few surveys or summaries of the available literature attempted.

It is from this category of materials that a researcher can best achieve an understanding of the present state-of-knowledge in disaster research. It is suggested that a researcher attempting to gain a familiarity with the disaster research field may do well to begin with the following three references which together should provide a relatively comprehensive overview of the existing state-of-knowledge.

- (1) Janis, I. L. Air war and emotional stress. New York: McGraw-Hill, 1951.
- (2) Nordlie, P. G. & Popper, R. D. Social phenomena in a post-nuclear attack situation. Arlington, Virginia: Champion Press, 1961.
- (3) Baker, G. W. & Chapman, D. (Eds.) Man and society in disaster. New York: Basic Books, Inc., 1962.

Janis' book, the older of the three (1951), was based largely on data from World War II experiences with bombing. One part is devoted to a description of reactions to the atomic attacks at Hiroshima and Nagasaki. A second part is concerned with psychological effects of air attacks primarily on civilian personnel in England, Germany, and Japan and a third part takes up psychological aspects of civilian defense.

The Nordlie - Popper report represents an attempt to summarize the disaster study findings in terms of hypothesized post-nuclear attack behavioral phenomena. It is one of the first attempts to make explicit hypotheses about post-attack behavior and its likely effects on societal recovery. It examines in separate chapters: (1) individual behavior in the post-attack situation, (2) socio-psychological phenomena in the post-attack situation, (3) the effects of a nuclear attack on necessary societal functions.

The Baker and Chapman book, just published at the time of this writing, is a compilation of 14 chapters, each devoted to a particular problem in the disaster field. The chapters are organized into five parts:

- Part I: Development of a New Research Area
- Part II: Behavior of Individuals in Disaster
- Part III: Behavior of Social Units in Disaster
- Part IV: Methodology and Theory: Other Views
- Part V: Research Programming

The book represents an attempt to begin the integration of the growing base of disaster study findings with theory and data from the mainstreams of the behavioral sciences.

A distinction can be made between a psychological perspective and a sociological perspective taken toward the study of disaster. The one tends to be concerned with individual reactions under disaster conditions and the

other with social structural effects of disaster. In point of fact, the material relevant to one is often also relevant to the other, and the distinction for the purposes of categorizing source materials is somewhat arbitrary. Such a discrimination among source materials was attempted, however, and materials which appeared to be more oriented to social structural concerns were placed in category 1.6. Considerable overlap of material between categories 1.3 and 1.6 occurs and for many purposes the two categories might best be considered one.

1.4 Eyewitness and historical accounts of disasters. (See page 44 in bibliography)

This is a relatively small category in the present bibliography and as yet no systematic search has been made to obtain other references of this type. Four of the references in this category deal with Hiroshima or Nagasaki. They provide sources of hypotheses and tend to indicate that an atomic disaster is similar in many respects to other kinds of major disasters in so far as the immediate behavior of people is concerned. Another reference is the story of the great Tokyo earthquake and fire in 1923 (87). That event is probably worthy of more study than it has yet been accorded even though only historical analyses are now possible. As a disaster--involving earthquakes, fire, landslides, and tornado-like winds--it is unparalleled in modern history and exceeded Hiroshima and Nagasaki in loss of life and destruction of property.

A recently published account of the Halifax explosion in 1917 (86) is a detailed and interesting companion piece to Prince's earlier work (162). The Halifax explosion was the largest single man-made detonation until the advent of the atomic bombs. With no warning, a munitions ship blew up in the harbor killing over 2,000 people, injuring over 9,000, and leaving over 25,000 without adequate shelter facing a raging blizzard.

1.5 Field, laboratory, and simulation studies of individuals and groups under stress (See page 45 in bibliography)

The developing body of literature on the behavior of individuals and groups in stress situations is of relevance to many post-nuclear attack problems. Included in this category are: (1) studies of small military groups under isolation and stress, (2) studies of the tolerance of stress of men in combat, (3) studies of survival (as in the case of airmen downed in enemy territory), (4) studies of reactions to internment, (5) studies of shelter living.

1.6 Studies, theoretical works, and source materials on societal functioning and effects of disaster on social structure (See page 48 in bibliography)

Highly related to and partially overlapping category 1.3 above, is the present category which contains a somewhat more amorphous collection of materials. This category is intended to focus on materials which emphasize a societal or social system perspective rather than an individual behavior point of view. There are no references, as there were in category 1.3, which tend to provide an overview of most of the material in the category. Three books which would appear to provide an orienting function, however, can be cited.

- (1) Iklé, F. C. The social impact of bomb destruction. Norman, Okla.: University of Oklahoma Press, 1958.
- (2) Barton, A. H. Social organization under stress. Washington, D.C.: National Academy of Sciences-National Research Council, 1962.
- (3) Titmuss, R. M. History of the Second World War: Problems of social policy. London: Longmans, Green & Co., 1950.

Ikle's book, based on World War II bombing surveys and other disaster studies, deals with the sociological and demographic effects of widespread bomb destruction. It examines the relationships between physical destruction and social effects, the problem of casualties, the effects of destruction of housing, problems of transportation, communications, and food supply, effects on manpower, and post-war effects of destruction. It attempts certain predictions of the social effects of nuclear attack and traces out the implications of these effects for civil defense and national planning.

Barton's book,³ is an attempt to summarize and integrate disaster research findings for the purpose of analyzing the operation of social systems under stress. It would appear that this book will become a major reference work for researchers concerned with social systems in disaster. It deals with such major topics as the state of disaster research, social roles in the emergency situation, organization and mass behavior in the emerging social system, and the restorative social system in community disasters.

Titmuss's book is a social history of World War II in England. It focuses on social change and social policy during the six year period of World War II. Topics examined in considerable detail are the evacuation of mothers and children, hospital services, and the social consequences of air attack. Government policy in the area of social services is traced from its inception through its development to its consequences. It is a major compendium of source materials covering a wide range of subjects relevant to the effects of a nuclear attack and civil defense planning.

³ At the time of this writing, Barton's book has been reviewed in its draft form only and the remarks based on the draft may turn out to be in error. It has subsequently been published and is now available.

In addition to these major works there are a large number of articles and reports dealing with related subjects. In this category also are included some basic references in sociological theory although no attempt has been made to provide a comprehensive listing of such materials. A number of items included in this category are concerned with methodological problems of research on social structure. In addition, there are a few references like Goure's, The Siege of Leningrad (134), which provides valuable historical insight into the effects of the siege on the political, social and administrative structure of the city. Lastly, there are included a number of references to studies or theoretical treatments of particular problems.

It would appear necessary that a satisfactory understanding of the social effects of disaster and their implications for societal recovery must come ultimately from some theoretical specification of the essential structure and functions of the social system. This, however, is the area in which theoretical developments are most inadequate and where, perhaps, the social system theorist can make the greatest contribution towards advancing the state-of-knowledge in this field.

1.7 Public opinion, knowledge, attitudes and communications
(See page 52 in bibliography)

Projections of post-attack phenomena will require certain assumptions about pre-attack public opinion, knowledge and attitudes as well as assumptions about communication processes within the society. A "data bank" is needed to furnish researchers with current national data on knowledge and attitudes, their change over time, and their change as related to specific other events. Such a facility does not exist currently,⁴ and this category is primarily intended to cite references to the major polls which have been conducted on

⁴Since this writing, the Sociology Department at the University of Pittsburgh has undertaken to establish such a facility under contract to the Office of Civil Defense.

these subjects. In addition, references are included on empirical and theoretical studies of certain communication problems which may be of concern in the post-attack situation. The literature pertinent to the communications aspect of this category has not yet been systematically searched, and for that reason, the present listing of items should not be taken as indicative of the literature available.

Of the public opinion polls, probably Berlo's study of public opinion on Federal fallout shelter programs (179), Withey's survey on the public's perspectives on cold war issues (200), and Moore's study of attitudes and knowledge concerning fallout shelters (193), will be found to be most useful. All of these were conducted in 1961 or 1962.

Relevant Related Sources

2.1 Nuclear weapons effects (See page 54 in bibliography)

While there is no need for behavioral scientists concerned with the social and psychological effects of a nuclear attack to become familiar with the physics involved in nuclear weaponry, it is clear that they need to have a knowledge of the characteristic effects of nuclear bombs. Basically they need to know the ways in which the environment of living is altered in terms of radiation hazards and physical devastation. The literature available on these topics is rapidly increasing. There are controversies over the interpretation of some nuclear effects data, but for the most part, in so far as the use the behavioral scientist has for specific effects data, these contro-

versies are not of critical importance.⁵

Ultimately the objective of post-attack behavioral research is to be able to state the projected social and psychological effects for any hypothetical attack one is interested in. This means the establishment of certain relationships between attack variables and effect variables. For this reason, there is a need for behavioral researchers to become informed about weapons effects.

Perhaps the best starting point for becoming familiar with nuclear weapons effects is:

Department of Defense. The effects of nuclear weapons.
Washington, D. C.: Author, 1962.

This document, a revision of the 1957 edition of the same title, might be considered the basic text in nuclear weapons effects. Based on the 1957 edition is another document:

Office of Civil Defense Mobilization. Nuclear weapons.
(Phenomena and characteristics.) Battle Creek, Mich.:
Plans and Operations Federal, State, and Local Plans
Operational Analysis Office, 1961.

This neither adds new information nor contains detailed descriptions or technical explanations, but does translate the technical material and mathematical formulae into tabular presentations of quantitative data on weapons effects. The Congressional Hearings of 1957 (208, 209, 210) provide another excellent source of basic information. From these basic sources, one can turn to a variety of references available on particular effects a sample of which is presented in this category of the bibliography. Included also are some damage assessments for hypothetical attacks on large cities, e.g., hypothetical attacks on Baltimore (214) and Washington, D. C. (205).

⁵ That is, for the behavioral researcher, it may be of critical concern that he be aware of the characteristics of fallout, but that within what may range from 0 to several thousand roentgens, it is likely to make no difference for his particular problem whether the biologically lethal dose for humans is 475 roentgens or 600.

2.2 Economic studies related to recovery (See page 57 in bibliography)

There has been greater effort concentrated on the study of economic factors in a post-attack situation, especially concerned with economic recovery, than on the study of other factors. The items included in this category do not represent an adequate coverage of the available literature, but rather comprise a selected set of materials which may be of interest to the behavioral science researcher.

One set of references included in this category (237, 261, 263, 264, 266) relate to the activities of the National Resource Evaluation Center (NREC) which is now a part of the Office of Emergency Planning. NREC has as its primary objective the development of better bases for selection, planning, implementing and testing non-military defense strategies. Files of resources considered to be important to survival and recovery are maintained at the Center and mathematical models for performing damage assessments and related functions are developed and run. A short paper which describes very generally the nature of NREC activities is

National Resource Evaluation Center, Executive Office
of the President, Office of Emergency Planning.
Demographic facets of nuclear warfare. A paper
prepared for presentation to the Population Association
of America. Washington, D. C.: Author, 1962.

Included in the references in this category are listings of the resource coverage tables available, a compendium of analytical programs, and the tables and parameters used in NREC damage assessment programs.

Another activity in this area which may be of interest is the PARM system--now Program Analysis for Resource Management, originally Post-attack Resource Management--being developed at the National Planning

Association. The original objective of this system was to determine an acceptable or preferred production program during the first two years following an enemy attack upon the United States, given the limits of the surviving resource levels. Its objective has been subsequently broadened to one of assessing the impact on the economy and strength of the United States resulting from any major change in final demands such as might come from disarmament, economic warfare, mobilization for limited war or from peacetime changes such as public works progress or economic recession. Accordingly, its present name reflects its broadened objectives.

An overview of the PARM system may be gained from:

- (1) Wood, M. K., & Norton, J. D. Post-attack resources management. Washington, D. C.: National Planning Association, 1959.

and from:

- (2) National Planning Association. PARM (Program Analysis for Resource Management.) Sixth Interim Report to the Office of Emergency Planning. July, 1962.

In addition to the materials discussed above, a few items are included in this category which may serve as sources of data about the economy.

2.3 Background material on the strategy of nuclear war and the environment of non-military defense (See page 60 in bibliography)

There is a surging growth in the number of books being published on the strategic situation of the United States today, the strategic options the nation faces, the dilemmas in which it finds itself, and prospects for the future of alternative paths of action. Many of these books contain interesting and important materials for any student of the possible effects of nuclear war.

They tend, however, to be polemic in nature and vehicles for arguing in support of a particular course of political action and for the most part, such books have not been included.

Not all items included are entirely free of the polemic element, but the works which appear here were believed to describe fairly clearly the alternatives and considerations which are part of strategic thinking in the modern thermonuclear era. Herman Kahn's, On Thermonuclear War (275), and Thinking About the Unthinkable (276), are controversial in many quarters, but are necessary reading for any student of nuclear war because Kahn, above all others, has been instrumental in setting the universe of discourse for almost any discussion of nuclear war. In addition to the abundance of technical, historical, and background material on nuclear war that Kahn presents, one of his important contributions is in analyzing the possible strategic alternatives available. Fryklund (273) and Hadley (274) furnish briefer resumes of the major strategic alternatives. Brody (269) provides an annotated bibliography of deterrence strategies.

In addition to Kahn's books, a major work (600 pages) focused on the strategic operational, legal, and constitutional aspects of non-military defense is presented in a doctoral dissertation by Chipman (270).

2.4 Civil defense (See page 61 in bibliography)

The best and most comprehensive sources of information about the objectives, the organization, the activities, and the thinking in the Office of Civil Defense are the congressional committee hearings of 1960, 1961, and 1962 (323, 324, 325, 326, 327, 328), and the annual reports of the Office of Civil Defense (295, 296). The hearings together with the annual reports provide a broad base of information, both general and specific, about almost

all matters pertaining to civil defense. The National Plan (314) together with its annexes provide a perspective on civil defense up to 1961. Presented in Appendix A is a short organizational history of Federal civil defense in the United States.

A subcategory of items included in this category provide information on shelters, home and community, blast and fallout.

A Concluding Note

This chapter was created to provide an interested behavioral researcher with an introduction to a body of available literature relevant to the study of social and psychological effects of nuclear war. It was assumed that a reader who was largely unfamiliar with the kinds of materials that existed could become informed far more rapidly through the use of a guide of the kind presented here.

Two caveats must be noted. First, there is no way to escape or refute the charge of bias in the selection of materials. The objective was to present an overview of the relevant literature, but it is necessarily an overview as seen through the eyes of particular researchers who have been studying the likely social and psychological effects of nuclear war. There may be those who feel that the materials selected present a distorted picture of the information available. (Those, for example, who take the position that the research objectives of this program are futile, unattainable, or immoral will be especially dissatisfied.) Unavoidably, to be sure, some bias exists. A redeeming factor, however, is the high probability that anyone who enters the literature through the materials presented here, ultimately through references and bibliographies, will be led to all of the literature available.

A second related criticism that can be made is that of omission of highly relevant materials. This charge also can be substantiated because there is no means available for insuring that all significant and pertinent materials have been identified and reviewed nor can there be an guarantee against simple oversight. Such criticisms are invited and welcomed because they will materially contribute to the development of a more comprehensive and useful collection of source materials, of which the materials listed in the bibliography are considered a beginning.

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ABSTRACT OF CHAPTER III

The Development of a First-Order Research Program on Possible Social Effects of Massive Attack

America, as a complex, industrial society, presents many analytic problems of extraordinary difficulty to the planner and scientist who would try to see it as the target of massive thermonuclear attack. An attack against American society is an attack not only on individuals and their physical environment, but also on a broad range of social processes which link individuals together. These social processes produce social roles and identities for individuals, and differentiated forms of social structure among collectivities of individuals. Both the data and theory needed to understand the effects of massive attack on American society as a set of social targets must be adequate to the task of discriminating attack effects on a variety of social levels. Much of the current debate on the impact of massive thermonuclear attack on American society has tended to obscure the scope of the analytic and projective task. Specialty research areas, such as "disaster research," have structural limitations, as a result of limitations in the usual scope of or approach to their subject matter, which make it difficult to generalize their findings toward projections of the social effects of massive attack. Furthermore, many current attempts to think about the social effects of massive attack seem to be obscured by structured uncertainties and ambivalences in the contemporary role of the behavioral scientist regarding the study of "social problems."

This chapter is the first of two chapters which present a research approach to the social effects of massive attack on American society. In the process of developing this approach, it has seemed necessary to try to see American society within a frame of reference which was adequate to its structural complexity, and which would allow an adequate discrimination of the different levels upon which attack effects would constitute a problem for the pre-attack planner and analyst. To order the analytic problems which have proved so vexatious and controversial to scholars and scientists, and to build a framework for fitting the wide variety of possible research studies on the social effects of massive attack into a unified program, a conceptual approach was developed for the purpose of seeing American society as the target of massive attack. This approach discriminates four principal levels of behavioral system within which social effects of massive attack occur. These systems are the ecological, individual, social, and cultural systems of society. As targets of attack these systems are either behavioral entities (the social and cultural systems) or organic entities (the ecological and individual systems).

It is suggested that these systems have complementary functions for the whole society, functions of either maintenance or adaptation, as society moves through time away from attack impact. To suggest more clearly the shifts in social process which may occur for each behavioral level and among behavioral levels after attack impact, a scheme of post-attack time phases is introduced. It is suggested that social processes in post-attack society will move through a time-dependent sequence, and that each of the four behavioral system levels will move approximately simultaneously through the same characteristic post-attack time phase. By seeing the four behavioral system levels of society as extending over a series of post-attack time phases, it is possible to generate a matrix for arraying a group of research studies on the social effects of massive attack, according to system level and post-attack time. This matrix does not automatically generate research studies. Rather, in the present stage of development, it should be seen as a useful device for making a number of hitherto elusive discriminations about levels and times at which certain behavioral phenomena may become critical problems, and for suggesting the interrelations among a wide variety of behavioral science research possibilities on the social effects of massive attack.

In the end, this chapter presents one way of beginning to think about the kinds of behavioral science research that might be done on the social effects of a massive thermonuclear attack on American society.

Chapter III


THE DEVELOPMENT OF A FIRST-ORDER RESEARCH PROGRAM ON POSSIBLE SOCIAL EFFECTS OF MASSIVE ATTACK

I. The Conceptual Task: An Orientation

A. Levels of Society as Targets of Attack

This is an essay about the development of a comprehensive behavioral sciences research program on possible social and psychological phenomena following a massive attack against American society. The following chapter lists, orders, and outlines the specific research studies which have been generated from the conceptual analysis undertaken here. While an important function of the present essay is to provide the conceptual machinery for generating these specific studies, and to suggest a larger frame of reference in which they can be justified, the essay also should be seen as having a number of independent functions. Perhaps the most important of these is to outline systematically one approach to the problem of developing an intellectual system and a structured program to aid in thinking about a complex reality composed of many interlinked levels. This complex, many-leveled reality is a modern society under the impact of a massive physical bombardment.

More than being a large aggregation of families and groups linked together in a common territory by a common cultural system, a modern society is characterized by its complex and highly differentiated structure of interrelated institutions. This structure is to be seen in the simultaneous presence of complex economic and occupational systems, in relatively fluid systems of social stratification where crucial strains in the social order can relatively easily arise, in explicit systems for exercising political power and stating collective programs and goals, and in values which emphasize individual achievement and autonomy either in one sector or all



sectors of society. This structural complexity does not exist merely on the level of institutions, however; the private lives of individuals and families may vary significantly across a wide range of social and cultural sectors. The national culture of an industrial society, while bound together by a number of integrative ideological themes, ramifies extensively according to differing patterns of individual life experience. Thus, the highly differentiated institutional and individual patterns of industrial society create many possibilities for structural strain within the society. A fundamental strategic process within industrial society is the institutional interplay which can be said to moderate those strains which occur when social structures become complex.

What happens when whole societies become the targets for massive attack? Beyond the harsh facts of individual deaths, how do the social lives of individuals and the institutions affecting their behaviors change? What kind of intellectual activity does a scientist imply or undertake when he says that a whole social system becomes the target for massive attack? How does one grapple intellectually with the analytic problems of understanding a society subjected to pressures which could lead to its profound internal disarray?

The scope of the conceptual task involved in answering such questions is magnified by the fact that useful evidence upon which to make projections about the social effects of massive attack is limited or specialized. Given the limited number of cases in which complex societies have experienced massive, intensive attack comparable to thermonuclear bombardment, and given the present state of the behavioral sciences, much of the basic analytic task in this essay has a speculative component. Here is a central challenge in the present analytic effort: finding a way to speculate usefully about conditions of stress and disruption which have not yet really occurred in complex society, while using a level of social theory or conceptual approach which is at least minimally adequate to cope with conceiving a whole society, in all its levels, as a potential target for many interacting varieties of massive stress.

A massive thermonuclear attack on a complex society may destroy or injure the physical bodies of individuals or groups of individuals, or directly alter their behavior. These gross, immediate effects on individuals constitute a first type of "direct" effect of massive attack; social effects of massive attack begin on this level. Yet both during impact of attack and the time following attack, it is possible to conceive of a broad range of individual and group behaviors, as well as institutional pressures, disruptions, and alterations, which may also result from massive attack. While triggered by attack, these changes constitute, as subjects of analysis, separate processes which, in many cases, may acquire their own impetus once attack has occurred. It has been customary to think of this larger range of social consequences of attack as the "indirect" effects of attack. But, to consider this type of attack effects as "indirect," while the first type of effects is conceived as the level of "direct effects," frequently tends to mask the fact that the indices of effect of both types are drawn from observable behaviors of individuals, groups, and larger components of the social structure in the time periods following massive intervention into the social system. There is nothing "more physical" about weapons effects on individuals or sectors of the population, or "less physical" about shifts in patterns of individual or institutional behavior following attack. Both types of effects of massive attack are reflected in observable behavior or the absence of behavior, which form the ultimate data of the behavioral scientist and social analyst.

B. The Role of Conceptual Schemes in Developing a Research Program

If both kinds of observable, behavioral attack effects form the substantive areas for research on post-attack social phenomena, the central

task in designing research on post-attack social phenomena is to find adequate ways of projecting the probable effects of massive attack for each significant form and level of behavior and institutional function and process within society. Then the task becomes one of relating these particular substantive projections of massive attack effects to a larger scheme, a scheme which will show the ways in which these projections can be seen as projections about the particular contributions made by particular levels and kinds of social attack effects to the total impact of attack upon processes critically necessary to the survival and recovery of society.

Left in this form, this statement of the central thrust of the research tasks of post-attack social research would probably be widely accepted. But later in this essay, it will become clear that a particular conception of social and psychological theory has been used to organize the vast range of possible post-attack phenomena which might seem important for study. This conception begins with a general analysis of the different levels of a society which can be considered to be attack targets. For each level, a number of critically important functional processes are implied. Thus, very early in looking at what research on post-attack behavioral phenomena might be done, a specific, organizing conception of levels of behavioral effect is introduced. Furthermore, each possible level of behavioral effect of attack is then projected through a hypothetical series of post-attack time phases. Each phase is demarcated either by given degrees of expected attenuation of weapons effects or damage, or a set of social processes around phase boundaries which may be thought to attend transition from one phase to another. Research areas emerge from considering likely effects and problems on each behavioral level for each post-attack time phase.

It must be quite frankly admitted that up to this point, the approach taken will seem speculative to a significant degree, based as it is upon a pre-attack construction of levels of societal functioning in relation to attack effects. It will be argued, however, that this approach permits a much more incisive, economical, and relevant approach to be taken to developing a series of behavioral criteria and requirements for the civil defense systems which will ultimately be designed on the basis of these research studies. The ultimate goal of this first-order research program is to make a unified group of projections about likely post-attack social phenomena and problems for all levels of social effect. Since these projections are to assist in the later design of civil defense attack countermeasure systems, it seems important that the research from which they derive should be explicitly designed with reference to the range of ways in which all levels of behavior in society may become targets for attack. In the current state of the art, this necessarily forces the research designer to take analytic leaps which ordinarily might be very unattractive.

Other approaches might seem more justified, partly by appearing less speculative. For example, a growing body of interesting and important research data and empirical generalizations on natural disasters provides many suggestive research leads into thinking about possible post-attack social phenomena.¹ In examining this body of research, however, it has

¹See the field studies of the Disaster Research Group, National Academy of Sciences-National Research Council. A number of central topical implications of the empirical data and methodological and theoretical problems growing out of these studies are presented in George W. Baker and Dwight W. Chapman (eds.), Man and Society in Disaster, New York: Basic Books, Inc., 1962. Loomis provides a systematic scheme for relating past and projected disaster research to needed research for civil defense planning. See Charles P. Loomis, "Toward Systematic Analysis of Disaster, Disruption, Stress, and Recovery--Suggested Areas of Investigation," in George W. Baker and Leonard S. Cottrell, Jr., Behavioral Science and Civil Defense (Disaster Research Group Disaster Study Number 16), Washington: National Academy of Sciences-National Research Council, (Publication 997), 1962, (Continued on following page)

seemed increasingly clear that there are serious inherent difficulties in fitting these disaster findings within an analytic framework adequate to cope

(Continued from page 73) Chapter 10, pp. 121-141. This chapter contains a number of suggested links between topics of continuing concern to behavioral scientists and civil defense planning as a focus for disaster research. See also "Part 4: Problems of Behavior in and after Actual Attack," in National Academy of Sciences-National Research Council, Emergency Planning and Behavioral Research ("A Report of the NAS-NRC Committee on Behavioral Research (Advisory to OEP)"), Wash., D. C.: National Academy of Sciences-National Research Council, 1962, pp. 18-22. This report was prepared by Ward H. Goodenough.

Baker notes a number of limitations on the generality of current disaster research studies and findings:

"The press of time often causes some field workers who are developing a new research interest to ignore the relationships between their immediate subject (e.g., human behavior in a Kansas tornado) and a general phenomenon (e.g., human behavior in modern American society under stressful or extreme circumstances). Being aware of this human tendency, we asked the contributors to Man and Society in Disaster to devote themselves to the further development of those existing sciences that are most appropriate for an understanding of human behavior in disaster. We have not encouraged any tendency to spawn a 'disaster science'." Baker and Chapman, op. cit., p. x.

"Since Pitirim Sorokin wrote Man and Society in Calamity (1942), orientations toward social theory have changed. Many of the reformulations were initiated by Robert Merton in his Social Theory and Social Structure (1948). No longer do our social theorists strive to explain all behavior by means of one grand theoretical system. During a period when man has achieved spectacular increases in the range and power of his mechanical and electronic systems, he has regrouped his intellectual forces and reoriented his expectations regarding the power and the range of his social theories. In codifying present knowledge about human behavior in disaster, our expectations are even more modest." Ibid., pp. x-xi.

"When the disaster program was initiated within the National Academy of Sciences-National Research Council, the first consideration was that federal administrators and planners need to understand and predict the kinds and ranges of human behavior that would be manifested in the event of a nationwide atomic attack. . . . Reports on the studies of natural disasters have not generally endeavored to extrapolate to thermonuclear disaster. While there still is much to learn about human behavior in natural and relatively small man-made disasters, there is no reason for further delaying a more concerted and systematic inquiry into behavior in a potential thermonuclear disaster. Therefore we asked the contributors of substantive chapters to try to extrapolate their findings from the completed disaster studies to a kind of disaster that is difficult to envisage. The lack of such information may be one of the most important gaps in our security system." Ibid., p. xi.

explicitly with the full range of possible post-attack social phenomena. At the same time, there seems to be a continuing tendency to try to establish the parameters of disaster as an event, without always closely relating these event parameters to constructs adequate to describe changing states of the target of the disaster. If this is, in fact, a lacking, it is a lacking which becomes especially limiting when complex society is the target of "disaster." Yet it is also evident that the organizing, analytic schemes of social process which are used to integrate levels of behavioral effect and research requirements, through projecting notions of societal and behavioral states, must fully utilize or account for the approaches and generalizations which have emerged from disaster research.

The disaster literature is one example of what may be many research areas where data and generalization relevant to post-attack behavioral phenomena exist in the social sciences. The desire here to exploit diverse and sometimes seemingly unrelated bodies of data and generalization for making projections about the impact of massive attack on society has helped to create a strong pressure toward developing a comprehensive analytic frame for viewing post-attack society. Parallel to this pressure toward organizing research within a larger frame has been a pressure to make explicit allowance for the possibilities which may exist for bringing several different research points-of-view in the behavioral sciences to bear on the same post-attack problem. Thus, the larger analytic frame has been used as a way of organizing a total first-order research program from the existing state of the behavioral sciences.

C. The Concept of "Research Program"

It becomes clear here that in generating this first-order research program, fully as important as developing an analytic framework has been introducing a notion of program which could take account of the existing realities in the behavioral sciences. The idea of program takes on a special meaning in this essay: the program envisioned here is an entity made up of component studies drawn from the existing subject matter areas

of the behavioral sciences. These component studies are juxtaposed so as to enhance opportunities for the reciprocal interplay of research insight and findings from one study to another, and thus to offer the hope for making qualitative leaps of insight beyond the constraints of traditional definitions of problems. At the same time, the proper juxtaposition of studies in the research program may offer opportunities for unexpected findings or generalizations which radically redefine the central problems of thinking about post-attack society. Thus, it should be evident throughout this essay that an analytic framework which seems suitable for discriminating the full variety of levels of social-behavioral effects of massive attack has been used as a means for systematically scanning the present structure of interests and activities in the behavioral sciences, to draw from these interests and research possibilities defined studies which offer the hope of making systematic projections of post-attack phenomena. The analytic frame used to approach a variety of existing research possibilities in the behavioral sciences is, in one sense, drawn from the current state of the art. In another sense, however, it is used to organize the current state of the art.²

²It will seem later, particularly in the listings of particular research studies on post-attack social phenomena, that this research program provides some duplication of content among the studies. This is by design. A research program runs a risk of violating the actual structure of the phenomena being studied by trying to carve the phenomena up into sharply discrete, tightly defined sub-areas. It also may actually hinder the discovery of the true nature of the phenomena by imposing what are ultimately artificial, irrelevant, or false boundaries on what seem, in the current state of knowledge, to be quite sharply demarcated bodies of content. Here, specialty fields of particular behavioral science disciplines are linked to other specialty fields, where there seems to be the possibility of more sophisticated thinking about post-attack social phenomena when the links are made. Many of the studies are interdisciplinary. As a group, a group of separate studies may sometimes imply quite different approaches to the same basic post-attack problem.

In writing on the organization of research and development efforts on military weapons systems, Hitch and McKean discuss the values of organizational duplication of effort, when a particular break-through is being attempted. While their point is addressed to a somewhat different concern, there is nevertheless
(Continued on next page)

As will be seen, then, an analytic scheme which could be both abstractly formalistic and quickly productive of a number of theoretical speculations is used not only for taking a theoretical look at post-attack social behavior, but as a way of tapping into a loosely organized research community.

(Continued from page 76) a lesson in it for the present effort to design a behavioral sciences research program on post-attack social phenomena:

"... The optimal amount of duplication in any particular situation is sensitive to...:

1. There should be more duplication, the greater the expected payoff from the research. In the Manhattan District Project, six completely distinct and independent methods of separating fissile material were under development concurrently; if the expected payoff had been less, fewer of these expensive 'duplicating' projects could have been justified. Incidentally, the method that succeeded in producing the material for the first bomb was regarded at first as among the least promising. There is a strong case for some duplication in the development of critical weapon systems, despite their great cost, because of the disastrous consequences if the one horse that we back runs last.
2. There should be more duplication, the greater the uncertainties...
- ...
4. There is a stronger case for duplication if the alternatives are qualitatively different, and if the factors that will determine their success or failure are independent."

Charles J. Hitch and Roland N. McKean, The Economics of Defense in the Nuclear Age, Cambridge: Harvard University Press, 1960, pp. 249-250.

On the importance of utilizing opportunities to gain insight from unexpected research occurrences, see Merton's celebrated note on serendipity in scientific research. Robert K. Merton, "The Serendipity Pattern (The Unanticipated, Anomalous and Strategic Datum Exerts Pressure for Initiating Theory)," in Social Theory and Social Structure, (Rev. ed.), Glencoe, Illinois: The Free Press, 1957, pp. 103-108.

Because this program of suggested research is an attempt to exploit the potentialities of a research community, it enters an environment which is composed not only of the potentialities, folkways, and predispositions of researchers, but also of the resistances which researchers may have to undertaking research on possible post-attack social phenomena. This essay takes cognizance, therefore, of some of the structural constraints within the behavioral sciences and some of the particular orientations toward choosing problems and thinking about society which characterize important sectors of the research community. Some of the studies in this research program quite explicitly acknowledge that some of the resistances which behavioral scientists may have toward thinking about post-attack phenomena may result from the naiveté and deficiencies which have characterized certain prior civil defense-related research efforts. Yet this essay also recognizes that larger subjective forces may be operating to lower the salience or desirability of doing post-attack social research. It becomes an interesting question in the sociology of science to try to determine more precisely the nature of these forces.

If this program is successful in shaping behavioral science research to meet civil defense planning needs, it will have provided civil defense policy-makers and operating officials with a set of initial, bounded projections of possible post-attack social behavior on all relevant levels of societal functioning. The present program does not lead immediately toward the design of particular civil defense countermeasure systems. Rather, the program aims toward providing projections and propositions about possible behavior, which will form part of the criteria used to suggest the necessary requirements of later countermeasure systems. The behavioral research done in support of designing particular countermeasure systems provides a later, second-order behavioral sciences

research program. The crucial role of this first-order program is to provide the fundamental behavioral criterion bases against which particular systems requirements can be projected.³

An example of the distinction between first-order and second-order studies, particularly as this distinction would apply to the design of countermeasure systems or policies for coping with possible longer-range post-attack social phenomena, is to be found in considering possible pressures toward large-scale population migration following massive attack. Existing data or possible data projections on the basis of historical experience or contemporary social theory may indicate that under certain conditions large groups of people may become motivated to move from their home locations to new homes. This has occurred where ecological balances of population-to-environment have been disrupted through climatic change, as in the American Dust Bowl of the 1930's, or in the wake of widely destructive wars, such as after the Thirty Years War of the Seventeenth Century or in 1945, when "displaced persons" wandered in Central Europe as a result of the simultaneous convergence of the effects of the collapse of several forms of social organization. Causal factors associated with the waved migration

³ As the first-order studies are completed and a possible second-order program evolves, the establishing of criteria to determine whether particular civil defense systems meet needs or achieve desired ends becomes a central problem of systems design. A useful treatment of this problem, as seen by two economists, who are attempting to determine how to allocate resources toward national security goals, is found in Hitch and McKean, op. cit., Chapter 7 ("Efficiency in Military Decisions," pp. 105-133) and Chapter 9 ("The Criterion Problem," pp. 158-181.).

of European settlers to the New World in the Nineteenth Century seem structurally similar to some of the patterns associated with the onset of these migrations, as does the migration to Israel following World War II.

Generally speaking, these migrations seem to have arisen under social conditions similar in key respects to those that might be expected to prevail following a truly large attack against American society. A first-order study of possible post-attack migratory behavior would be to organize existing data and theory on demography and population movements in complex society, in both stable times and stressful times, for the purpose of making projections about possible migratory pressures or migrations under post-attack conditions. It would seek also, again for example, to discern processes of communication or other social structural processes which may reinforce initial tentative migrations. From this first-order study would result a unified body of projections of possible migratory pressures or phenomena, for a variety of post-attack conditions, stated in a propositional form which would enable the systems-designer to determine those migratory phenomena with which any countermeasure system or class of systems would have to cope.⁴ The second-order study leading out of this first-order study would be, initially, a conversion of these projections into projections and validating criteria for estimating the effects of a particular, possible policy or countermeasure system designed to control migrations or

⁴For a discussion of some of the extended philosophical and methodological problems in stating projections about post-attack society in systematic propositional form, see Abbe Mowshowitz, The Foundations of Post-Attack Behavioral Research. Arlington, Va.: Human Sciences Research, Inc., 1963 (in preparation).

guide them in desirable directions. As the second-order study progressed, it would evolve, for example, into an estimate of the behavioral effects of the proposed countermeasure system, seen against the policy-maker's utility functions or criteria of desirable or undesirable alternative national policy outcomes of alternative national programs for controlling migration after attack.

As a program designed to provide first-order data on society as target for massive attack, this total program draws from a wide range of behavioral science concerns. The basic problem to which all the studies point, each in their given sector of attack effect, can be put in the form of a question: in what terms can behavior and social structure following a massive attack be described? This leads to many levels of question, but perhaps the most important ultimate question is a general question about American values and the style of life Americans may be said to have: to what extent are the values and value-emphases which characterize American society targets of attack? What are the requirements of systems which may have to cope with the ways in which post-attack behavior and social structure may exert pressures to alter the distinctive style of American society?

In enlisting behavioral scientists to help provide answers to these questions, the research program suggested in these two chapters has tried to recognize the full problem of describing attack impact on American society, the needs of policy and operating officials for estimates of social processes and individual behavior following massive attack, and the existing structure and biases of the behavioral sciences. The kinds of countermeasure systems which result from a series of first-order and second-order behavioral science research studies may, in many cases, be designed and implemented in the pre-attack society, to forestall

maladaptive post-attack behavior.⁵ Or, the criteria and projections of likely social effects may form the bases of policies for managing post-attack society. But regardless of the time use of behavioral projections which translate into the requirements for counter measure systems and action policies, behavioral scientists can form one component of a process which leads to more intelligent thinking about the needs of American society under massive attack.

This chapter continues into a brief examination of some current ways of thinking about American society as a target of massive attack. There follows a discussion of the analytic scope of the problem of thinking about American society under massive attack. This necessarily involves a brief consideration of some of the institutional constraints which have shaped the address of the behavioral sciences to this problem, and an assessment of the theoretical as well as program requirements of any effort to project the social effects of massive attack. Finally, this chapter presents a tentative analytic framework for considering American society as a target for massive attack on a number of levels. This is preparatory to the presentation of substantive research studies in the following chapter.

⁵ If there were not far more serious matters confronting behavioral scientists in a possible post-attack world, it could be said that the establishment of pre-attack countermeasure systems based on their projections and criteria would present a final methodological dilemma, a dilemma not new to those trying to influence behavior. If the undesired behavior did not occur, how could the behavioral scientist be sure that (a) the countermeasure system based on his projections and criteria uniquely did the job it was supposed to do; (b) the behavior he projected really would have occurred in post-attack society? This is a new twist on the old logical problem of proving the negative. The implication does not seem to be, however, that no planning should be done in the present.

II. Images of Post-Attack Society: The Road toward Fantasy and the Road Toward Empirical Projections

A. The Disagreements among Analysts

Possible states of American society following a massive thermo-nuclear attack have already been the subject of wide discussion among behavioral scientists or individuals utilizing a behavioral sciences perspective. A number of writers have found the prognosis for the American social system to be very bleak. For some, it would appear that just the conditions created from countermeasures designed to cope with short-term attack effects will be so severe that it is, by implication, almost meaningless to consider longer range effects of massive attack. In a short piece on the "Dangers of the Shelter Psychology," Klineberg says:

To burrow beneath the ground for weeks, or even longer, means for human beings a denial of most of the values which have been acquired slowly and painfully in the process of creating a democratic society. Instead of community there is a splintering into isolated individuals or tiny groups. Instead of cooperation there is violent competition for available space. Instead of mutual aid, there is a selfish struggle for individual survival.

Psychiatrists speak of regression when adults behave in a manner appropriate to children. We may speak of social regression when a whole community behaves in a manner characteristic of primitive, archaic, even animal-like existence, almost to the point of recreating a Hobbesian war of all against all.

If our stake in the present ideological struggle is to preserve a way of life, we may well ask ourselves how much of our way of life would be maintained under the conditions imposed by resort to shelters. Our democratic values would be submerged in a crass and cruel struggle for survival, made even more bitter because the struggle may be futile. There will

be irritations and frustrations arising from the enforced and continued contact with others for an extended period without the relief of occasional privacy; there will be anxieties concerning those from whom one has been separated; there may even be a breakdown of psychological defences because of worries about the uncertain future. Prolonged incarceration under such conditions may be a devastating experience.⁶

Another writer, who has studied the effects of contemporary weapons systems, is moved to make this observation about the longer term prospects of American society:

It's been argued that under a nominal--i.e., 2000 megaton--attack, we could recover a high level of gross national product in a decade or two. But if one looks at the studies on which these arguments are based, one is overwhelmed with the evidence that recovery would only be accomplished by the most stringent and controlled allocation of human and natural resources. Given likely situations following a major thermonuclear attack, it is clear that democracy is not among those items that survive or can be stockpiled for the post-attack period. It is probably true as well that the Russian form of communism would not survive either. One wonders then what the purpose would be of getting into an all-out nuclear exchange, since presumably countries with sane leaders would not take on a senseless war which would lose for them that which they wanted to preserve through the war. Yet leaders talk about not being afraid to defend their ideals even if it means nuclear war.⁷

If these are representative of the effects of a massive attack upon America, then it becomes difficult to make distinctions among degrees of

⁶ Otto Klineberg, "Dangers of the Shelter Psychology," in A National Shelter Program: Its Feasibility and Cost ("A Report by a Group of Independent Specialists" available from Box 577, N.Y. 27, N. Y.), 1962, p. 26.

⁷ Donald N. Michael, "Psychopathology of Nuclear War," Bulletin of the Atomic Scientists, Vol. XVIII, No. 5 (May, 1962), pp. 28-29, at p. 29. There is some question as to whether a "2000 megaton" attack is to be described as a "nominal" attack. Presumably, "the studies on which these arguments are based" refers, at least in part, to the RAND studies to be cited later in this section.

attack or damage--massive thermonuclear attack, through its quantitatively vast impact will produce fundamental qualitative changes on all levels of society. When such consequences are possible, important distinctions among forms of impact, distinctions which have previously been useful in strategic planning, disappear in the face of the horror and traditional analytic forms are no longer relevant. Gerard Piel, in criticizing "The Illusion of Civil Defense," describes analysts who would still try to make discriminations among varying possible impacts of attack on American society:

Now those who advance the feasibility of thermonuclear war do not claim that it is desirable. After living with the subject for more than a decade, however, these authors have learned not to shrink from horror. They face facts from which others recoil and distinguish between "a hopeless situation" and "a grim one," between a situation that "could be very serious" and yet "not catastrophic," between an "unprecedented catastrophe" and an "unlimited" one. From close study of these distinctions they conclude that it is possible "to prevail in some meaningful sense of the term," if "not win."⁸

Such distinctions, Piel argues, are used to support a notion of "civil defense," a notion which has inherent illusions and is thus capable of deluding. While Piel's basic argument seems to be that the illusion of civil defense lies in its alleged tendency to increase the likelihood of war,⁹ the implication is clear that the kinds of distinctions he describes are part of a larger fallacious way of looking at strategy and society. As a result, this

⁸Gerard Piel, "The Illusion of Civil Defense," Bulletin of the Atomic Scientists, Vol. XVII, No. 2 (February, 1962), pp. 2-8, at pp. 2-3.

⁹"Close-range contemplation of thermonuclear war has brought many citizens to the conclusion that civil defense is an illusion--a dangerous illusion because it increases the probability of war." Ibid., p. 2.

implication about modes of strategic thought reinforces the position that massive attack will cause totally destructive short-term and long-term social chaos. It does this not only by attacking the particular results of analyses of attack impact which use these modes of thought to generate analyses, but also by raising the fundamental question of whether it is possible really to think meaningfully about post-attack social states. It is not meaningful to try to think about post-attack social conditions if there must be inherent, critical ambiguities in any forms of thought used to project post-attack social states, or if empirically based attack projections indicate necessarily that attack effects are so excessive as to destroy the possibility of making discriminations among post-attack states.

There can be little doubt that among the principal targets of Piel's comment is the type of analysis undertaken by Herman Kahn; this mode of analysis originated essentially in a series of studies conducted at the RAND Corporation.¹⁰ Central to Kahn's analysis is a basic point deriving

¹⁰ A principal RAND report on these studies is The RAND Corporation, Report on a Study of Non-Military Defense ("Report R-322-RC"), Santa Monica, California: The RAND Corporation, July 1, 1958. It outlines several alternative non-military defense programs and a series of broad policy suggestions, based on studies of the possible use of population shelters, possible consequences of fallout radiation, problems of economic recuperation, and relations between military and non-military defense programs. On page iv it is noted:

"This report is unclassified, and no part of it depends on the use of classified information. In particular, the hypothetical attacks considered in evaluating various non-military defense measures should not be construed as statements of enemy offense capability or of U.S. defense capability. They are simply hypotheses about threats that appear conceivable sometime in the future and that provide a measure of the possible role of non-military defense systems. Moreover, this report has been written as a summary statement for general distribution; technical aspects of the study are not presented in full detail."

Herman Kahn directed this study throughout its phases. In a later work, Kahn has developed his mode of analysis to include a large group of evolving
(Continued on next page)

from a number of individual projections of possible states of post-attack society: that for a significant range of possible massive thermonuclear attacks, it is possible to consider American society--or industrial society in general--as having sustained a terrible blow without its having

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(Continued from page 86) strategic possibilities in contemporary and future thermonuclear warfare, particularly as these possibilities imply the need for civil defense counter measure systems. See Herman Kahn, On Thermonuclear War, Princeton, N. J.: Princeton University Press, 1960. RAND researchers have also presented their analyses before Congressional committees cognizant of federal civil defense activities. See, for example, U. S. House of Representatives, Civil Defense-1961 ("Hearings before a Subcommittee of the Committee on Government Operations, House of Representatives, Eighty-seventh Congress, First Session - August 1, 2, 3, 4, 7, 8, and 9, 1961"), Wash., D.C.: U. S. Government Printing Office, 1961, esp. pp. 167, ff., 207ff., 263ff., 303ff., 344ff., 361ff.

Among the RAND papers specifically devoted to problems of post-attack social organization are Jack Hirshleifer, "Some Thoughts on the Social Structure after a Bombing Disaster" ("P-674"), Santa Monica, California: The RAND Corporation, May 11, 1955 (Rev. August 18, 1955), and Jack Hirshleifer, "War Damage Insurance" ("P-519"), Santa Monica, California: The RAND Corporation, May, 1953. Iklé, who has been closely associated with the RAND analyses, discusses the varieties of social effects produced by World War II bombings. See Fred Charles Iklé, The Social Impact of Bomb Destruction, Norman, Oklahoma: University of Oklahoma Press, 1958. Gouré discusses the great capacities of a civilian population to withstand an extremely severe, long-lasting siege, even after allowances have been made for the fact that this siege occurred in a social system where a high degree of official control of individual behavior is customary. This study, which began as a RAND study with special emphasis on administrative controls during siege conditions, has been published as Leon Gouré, The Siege of Leningrad, Stanford, California: Stanford University Press, 1962.

Hitch and McKean, op. cit., Chapter 17 ("Mobilization, Civil Defense, and Recuperation"), pp. 312-333, working in the framework of strategic analyses developed in the RAND studies, examine civil defense planning in the context of other closely related national security planning problems.

necessarily sustained a fatal blow. In On Thermonuclear War, Kahn presents a table depicting a number of "tragic but distinguishable postwar states."¹¹ In suggesting here that it is possible to conceive of an attack in which 2,000,000 die as requiring one year for "economic recuperation," while an attack in which 40,000,000 die might require twenty years for "economic recuperation," Kahn is ready to admit that both mortality figures and indicators of "economic recuperation" may be somewhat in error, or that there might be debate over what constitutes "recuperation." But Kahn's point here is that even in these magnitudes,

¹¹"Table 3" Kahn, op. cit., p. 20. Table 3 follows:

Table 3

TRAGIC BUT DISTINGUISHABLE POSTWAR
STATES

Dead	Economic Recuperation
2,000,000	1 year
5,000,000	2 years
10,000,000	5 years
20,000,000	10 years
40,000,000	20 years
80,000,000	50 years
160,000,000	100 years

Will the survivors envy the dead?

it is possible intellectually to come to grips with damage assessment, and to decide that if ways could be found to limit the number of dead from what it might be without protection, then it would be possible to measure the gain to society which would result by taking protective action. Kahn points to the unfair assumptions which more or less sophisticated individuals tend to make as they contemplate the effects of massive attack:

The survivors will not dance in the streets or congratulate each other if there have been 20 million men, women, and children killed; yet it would have been a worthwhile achievement to limit casualties to this number. It is very difficult to get this point across to laymen or experts with enough intensity to move them to action. The average citizen has a dour attitude toward planners who say that if we do thus and so it will not be 40 million dead--it will be 20 million dead. Somehow the impression is left that the planner said that there will be only 20 million dead. To him is often attributed the idea that this will be a tolerable or even, astonishingly enough, a desirable state!¹²

Kahn points here to a strange anti-intellectualism among many observers, who react to a particular projected state of post-attack society to the total exclusion of trying to place that state within a larger frame of reference. The latter effort requires the use of an analytic capacity, while the enormity of thermonuclear weapons enhances tendencies to deplore, to pass judgment upon a horrifying even.. But it is Kahn's point that one can--and indeed, if he is a civil defense planner and administrator, must -- react in human, normative terms to attack effects while simultaneously preserving his capacity to make effective, empirically based discriminations among a variety of possible attack effects. Granted

¹² Ibid., pp. 20-21. Emphasis in the original.

that there may be ambiguities about the projections, ambiguities related to the problems discussed in Section I of this essay, the final meaning of the RAND studies is that it is possible to think coherently and empirically about possible states of post-attack society for a broad range of conceivable attacks, and to make potentially more accurate plans on the basis of these projections than might otherwise be made.

Kahn suggests that the ultimate question about distinguishable post-war states is summarized in the question, "Will the survivors envy the dead?" He answers:

... It is in some sense true that one may never recuperate from a thermonuclear war. The world may be permanently (i. e., for perhaps 10,000 years) more hostile to human life as a result of such a war. Therefore, if the question, "Can we restore the prewar conditions of life?" is asked, the answer must be "No." But there are other relevant questions to be asked. For example: "How much more hostile will the environment be? Will it be so hostile that we or our descendants would prefer being dead than alive?" Perhaps even more pertinent is this question, "How happy or normal a life can the survivors and their descendants hope to have?" Despite a widespread belief to the contrary, objective studies indicate that even though the amount of human tragedy would be greatly increased in the postwar world, the increase would not preclude normal and happy lives for the majority of survivors and their descendants.

My colleagues and I came to this conclusion reluctantly; not because we did not want to believe it, but because it is so hard to believe. Thermonuclear bombs are so destructive, and destructive in so many ways, that it is difficult to imagine that there would be anything left after their large-scale use. One of my tasks with The RAND Corporation was to serve as project leader for a study of the possibilities for alleviating the consequences of a thermonuclear war. That study was made as quantitatively and objectively as we could make

it with the resources, information, and intellectual tools available to us. We concluded that for at least the next decade or so, any picture of total world annihilation appears to be wrong, irrespective of the military course of events.¹³

While Kahn does not usually provide the detailed data-processing steps which his studies employed in the process of reaching conclusions, he does show the nature of the intellectual process in which he has engaged, and he is articulate and explicit about the assumptions which have guided his thinking and the constraints and limitations upon his conclusions.¹⁴ This is not necessarily to support all of Kahn's conclusions or approaches; it is simply to say that Kahn has attempted to show that an analytic address to problems of post-attack social research is, under certain conditions, plausible and feasible. Other analysts, who have been perhaps more pessimistic about the recovery capabilities of American society, have explicitly addressed the analytic problems presented by projecting post-attack recovery capabilities and have found them manageable. Morgenstern, for example, outlines some of the characteristics of a "sub-economy" which, if provided in advance of a massive attack, would maintain the basis for generating economic recovery.¹⁵ Lapp, speaking from an

¹³ Ibid., pp. 21-22. Emphasis in the original.

¹⁴ See especially his Chapter II, "Will the Survivors Envy the Dead?" in Ibid., pp. 40-95. Note, for example, the full meaning of his "Seven Optimistic Assumptions," pp. 84-95.

¹⁵ Oskar Morgenstern, The Question of National Defense, New York: Random House, 1959, pp. 123-129. His Chapter 5 ("Attrition, Shelters and Recovery"), pp. 104-133, treats the general issues of population and societal vulnerabilities to wars of varying scale, and suggests requirements and limitations of selected counter-measure systems, especially shelters.

extensive professional background in nuclear physics, vividly describes possible "overkill" capacities in contemporary weapons systems, asserts the final necessity of disarmament, but considers a significant intermediate range of attacks and attack effects where it is still possible to contemplate protecting a population.¹⁶ Directly examining the relation of attack strategy to post-attack population composition, Fryklund defends the adoption of a "No-Cities Strategy," as offering a higher probability of preserving the urban resources of society in a thermonuclear exchange.¹⁷

¹⁶Ralph E. Lapp, Kill and Overkill: The Strategy of Annihilation, New York: Basic Books, Inc., 1962, esp. Chapter 5 ("Blast, Fire, and Fallout"), pp. 49-64, and pp. 117-121.

¹⁷Richard Fryklund, 100 Million Lives: Maximum Survival in a Nuclear War, New York: The Macmillan Company, 1962. From the viewpoint of a behavioral scientist, this book may suffer from the limitations inherent in its being an argument for a particular strategy. It nevertheless well reflects--perhaps precisely because of its mission--a whole style of conceiving attack effects in the light of a variety of strategic options.

Fryklund, a military writer for the Washington (D.C.) Star, makes this observation concerning contemporary blocks to thinking about post-attack society:

"Outside the Pentagon you find little interest in postwar America. Two assumptions are common in Congress, most Executive departments, and among the writing public. One is that nuclear-war destruction necessarily will be so great that there is no use wasting time finding out just how great. The other is that any research that might show that nuclear-war destruction could be less than total is dangerous; it might encourage militarists in the Pentagon or Kremlin to start the war.

"People who accept the first assumption ridicule anyone who wants to examine the postwar world carefully, because such research is 'wasteful.' People who accept the second criticize anyone who studies the postwar world, because such research 'promotes war.'

"In the face of this discouragement, few people have found the incentive, time, or money to check on the accuracy of our common mental picture of postattack conditions." Ibid., pp. 130-131.

If there is a substantial body of analytic literature in support of the meaningfulness of trying to define and project the social effects of massive attack, there are parallel bodies of literature which suggest that humans as individuals and in groups have great capacities to endure persistent deep stress while preserving basic values. These capacities to endure stress tend to refute the frequent image of post-attack society as creating the conditions for the "Hobbesian war of all against all." Biderman, in an analysis of data on the behavior of American prisoners of war during the Korean Conflict of 1950-1953, finds that popular reporting of their behavior sharply misrepresented the capacities of the overwhelming majority of these prisoners to behave coherently and adaptively during captivity, and in consonance with American military and patriotic values.¹⁸ Perhaps more important than Biderman's specific attempts to revise the record, about which debate continues,¹⁹ is his general discussion of the mechanisms through which fantasy images

¹⁸ Albert D. Biderman, March to Calumny: The Story of American POW's in the Korean War, New York: The Macmillan Company, 1963.

¹⁹ See the "Letter to the Editor" by Eugene Kinkead in Time, Vol. LXXXI, No. 5 (February 1, 1963), pp. 6, 8, in comment on the January 18, 1963, review of Biderman's book in Time. Kinkead, whose book In Every War But One forms a principal target for Biderman's critique of reporting of POW behavior, claims that Biderman's researches should be seen as forming part of the Air Force side of a controversy on "The Code of Conduct" for American prisoner-of-war behavior. This controversy, Kinkead says, was essentially between the Army and the Air Force. Kinkead reports that the Army won, and that the material for his book formed the Army's position in the controversy. Kinkead summarizes the difference between the Army and Air Force as follows: "A king-sized deadlock resulted, centering essentially on what a service should demand of its men--in other words, the ideology of duty. Air Force wished less, Army more, demands." By his own statement, however, Kinkead says "the conduct of American prisoners in Korea may remain a controversial subject for years." His comments therefore focus on "background." See Eugene Kinkead, In Every War But One, New York: W. W. Norton and Company, Inc., 1959.

and misperceptions can arise in a public context where fantasies and images seem to meet certain needs.

In examining the existing total state of knowledge of the behavioral sciences, as this knowledge might bear upon the possible social consequences of a thermonuclear attack, Nordlie and Popper summarize a substantial body of literature on stress and disaster in this hypothesis: "The behavior of people in a post-nuclear attack situation generally will be adaptive rather than maladaptive."²⁰ They hypothesize further that "Wide spread mass panic will not occur."²¹ One general, summary proposition which would derive from their hypotheses is that in many particular areas where post-attack planning is required, individual behavior must be adapted to an altered but nevertheless coherently understandable series of social structural changes. For example, individuals may experience stress because of the sudden rearrangements in the ways in which their life roles can be performed and are seen to require performance.²² This phenomenon of "role conflict" which has existed in natural disasters but which has been reported in many other situations, including the Hiroshima attack, requires that the analyst take a sociological frame of reference to achieve a systematic understanding of an important form of stress reported by individuals.

Some of the dynamics behind the sharp disagreement over the possible post-attack social world now become clearer. It would be

²⁰Peter G. Nordlie and Robert D. Popper, Social Phenomena in a Post-Nuclear Attack Situation: Synopses of Likely Social Effects of the Physical Damage, Arlington, Va.: Human Sciences Research, Inc., 1961, p. 88.

²¹Ibid.

²²Ibid., pp. 22-23.

simplistic to place Klineberg, Michael, and Piel at one pole of an hypothetical scale of issues, while placing such writers as Kahn at the other pole. Yet there are several clear axes of disagreement. Since this present essay is focused on the possible content and characteristics of a behavioral sciences research program on possible post-attack behavior and society, the question of whether research on these phenomena increases the likelihood of thermonuclear war will not be given direct consideration. This is a question which combines considerations of fact with those of value--in the end, a final decision within the national security establishment to undertake such research must include weightings for the contribution which such research might make to goals of national security, especially in the light of additional decisions about the feasibility of the research, and weightings of the extent to which such research efforts can be seen as eroding international stability. This decision seems to involve weightings and constraints which are not intrinsically different from other decisions to support research and development efforts for national security purposes. It does seem, however, that failures by individuals outside the national security establishment to perceive post-attack research as being research subject to the same constraints and possibilities of misperception as other national security-related research have encouraged a tendency to see post-attack and civil defense-related research as uniquely or unusually provocative.²³

²³ Recall Piel's claim that for many, civil defense is an illusion "because it increases the probability of war." Footnote 9 *supra*. For a discussion of some of the constraints operating upon an assessment of civil defense requirements (and, by implication, related research), see Hitch and McKean, *op. cit.*, pp. 323-333.

Granted that a controversy exists over the possibly provocative nature of anything having to do with civil defense, the important issues for now are of a somewhat different nature. Klineberg's and Michael's positions characterize one implicit point-of-view in the first important issue. They make specific assertions about what life will be like after a massive attack. For Klineberg, life in shelters will be ugly, viciously competitive, and ultimately destructive of social values. For Michael, the conclusion is that democracy cannot survive a massive attack. It is important to note that these writers have not said that nothing will be left, or that it is meaningless to try to make descriptions about and discriminations among post-attack states of society because of the magnitude of the horror. They make specific propositions, and they imply that evidence exists to support their propositions. The issue then becomes whether existing evidence supports their propositions. If it does not, what does this reveal about further requirements for and uses of evidence, about their own use of evidence, and about their own mode of formulating propositions?

Piel's rather mocking description of attempts by analysts to discriminate post-attack societal states points to the second important issue. This is the question of whether it is meaningful at all to make projections about post-attack social phenomena. Piel's comment focuses on one part of the empirical side of the question: the claim that the magnitude of destruction will be so great that analytic discriminations are impossible. The other side of the empirical claim possible here would be that evidence indicates that weapons effects will produce behavioral effects which mean the end of organized behavior. This side would approach the Klineberg point, yet it is different, since Klineberg's point is that behavior would be highly individualistic and anti-social, not that it is asocial or even non-existent in his conceivable post-attack world. There is also an

important and interesting philosophical question in this issue--whether it is possible in principle to make meaningful propositions about a post-attack world in advance of the fact. How does one formulate projections and act on them, when they are not empirically verifiable in the accessible future?²⁴

²⁴ See Footnote 4 supra. This philosophical question has vital and recurrent implications for strategic policy-making, as was recognized at one of the early conferences from which The RAND Corporation emerged. In outlining possible studies which the new research group ought to do, the conference reporters made this statement about studies of enhancing "reliability of prediction":

"Decision makers must frequently rely on expert predictions and guesses without any objective basis for appraising the judgment or methods of improving it other than through developments in the underlying theory. The problem is to determine the optimal techniques for the exploitation of such predictions by suitable selection and combination of expert judgments and by the use of ancillary data by which the prediction might be appraised--e.g., statements of confidence in and basis for the prediction. The problem can be approached experimentally, as well as by expert analyses of their own past errors, by psychological study of how successful predictions were arrived at, and by statistical analyses of various systems of combining and weighing judgments. Relevant data can also be accumulated in the course of routine operations in which expert predictions are sought. Although the likelihood of yield in such an investigation is not high, even slight improvements in reliability will be of incalculable value to realistic policy formation."

PROJECT RAND, "Conference of Social Scientists: September 14 to 19, 1947 - New York," ("R-106"), Santa Monica, California: The RAND Corporation, June 9, 1948, (Originally classified "Restricted" and subsequently "Confidential"; declassified November 26, 1956), p. xvi.

Perhaps the fundamental problem of strategic intelligence and policy-making is to make reliable estimates of situations and events in the face of the impossibility of directly verifying them until it is too late.

In the end, both broad issues resolve into a basic two-part question: what present evidence exists from which to project post-attack social states, and what do projections based on this evidence mean? It appears that both Klineberg and Michael have particular evidence in mind, but if they do, how would they reconcile it with other evidence, the existence of which has been suggested in this discussion? This is not the place to say that Klineberg and Michael are wrong in their conclusions, for the purpose of this essay is to suggest that on all questions of post-attack research, substantial jobs of assembling and thinking about pertinent evidence remain to be done. Yet it cannot be said that they are correct, for if they mean to engage in scientific dialogue, they must reconcile their claims with evidence and approaches which quite clearly seem to contradict their claims. Unless they do this, they are open to the charge that they have engaged in suggestive fantasies about the post-attack world. Will individuals suppress years of socialization and apparently great capacities for enduring excruciating stress to launch a "war of all against all" after massive attack? The Hobbesian image is compelling and comprehensible. Is it also accurate?²⁵

Similarly, it is possible to imagine an ultimate nihilism about massive attack. If a massive attack destroys almost everything, then how can one think about its effects coherently? But the burden is equally upon those who would say thinking is impossible, because usual

²⁵ The present author has examined a number of uncritically accepted images of individual and societal process which have characterized certain commentators on the civil defense shelter program, in S.D. Vestermark, Jr., "Social Science as Systematic Anxiety," in press.

distinctions and existing data are now irrelevant, and those who argue that over a range of discriminable conditions, existing data can be combined to form meaningful propositions about post-attack society. The issue is not resolved, however, by focusing on the upper limits of attack possibilities, for all sides of the issue admit that if weapons technology continues its uncontrolled development, it will be possible to conceive of attacks which might render useless distinctions among varying post-attack worlds. The issue must turn, rather, on whether it is possible to make meaningful projections and discriminations for attacks which are now possible. What does existing data of varying kinds in the behavioral sciences tell us about possible post-attack social conditions after possible attacks, when this data is systematically examined?

In the present state of the behavioral sciences, it seems important to be self-critical of the bases on which data are to be generalized to conditions which have not been experienced. But precisely because of this, vivid metaphors and images are not a substitute for systematic examination of what has been experienced, and for systematic consideration of what else might be known as a result of this experience.

B. American Society as a Subject for Analysis

(1) Civil Defense as a "Social Problem"

(a) The present paradox of the behavioral sciences

While the debate has not been confined to them alone, behavioral scientists have been among those groups which have been especially sharply divided by the contemporary debate over how to describe post-attack behavior and society and whether post-attack behavior and society can be described significantly. Frequently there has seemed to be a peculiar readiness to

abandon scientific dialogue and the use of existing evidence and knowledge, in favor of arguments based on a priori conclusions of fact and deeply held normative positions and feelings about society. That this has occurred among behavioral scientists thinking about post-attack research and about the possibly larger questions of the measures which should be taken to enable American society to withstand massive attack reflects a current paradox in the position of the behavioral sciences in American society. Especially since World War II, there has been a heightening awareness in the policy-making levels of government that behavioral scientists have many relevant insights to offer those who make policies affecting the condition of society.²⁶ This has been an important opportunity to behavioral scientists and to the institutionalized behavioral sciences research community. But this opportunity has come at a time when there has been searching discussion in the behavioral sciences about the defining methodology, scope, and content of these disciplines. In this discussion there has been much uncertainty about the proper address which behavioral scientists should make toward research questions which might involve them in taking sides on public issues, or in becoming allies of proponents of particular policies, by supplying these proponents with convincing data in support of their policies.

The paradox in the present position of the behavioral sciences is that these institutionalized forms of acquiring knowledge are being called upon to

²⁶ For one sign of the increasing awareness among behavioral scientists that they are especially relevant to public policy-making, see Daniel Lerner and Harold D. Lasswell (Eds.), The Policy Sciences: Recent Developments in Scope and Method, Stanford California: Stanford University Press ("Prepared and published under the auspices of the Hoover Institute and Library on War, Revolution, and Peace" - "Hoover Institute Studies"), 1951.

supply knowledge to the policy-maker just at a time when the disciplines are maturing, becoming self-conscious of the boundaries between science and policy, and thereby experiencing a deep ambivalence toward social problems and public policy. Those behavioral scientists who have solved the problems posed by this ambivalence are in a much freer position to speak out--whether with deliberation or impulsiveness--than those who are not yet sure of how they should relate to social problems, in their role of behavioral scientists. For some scientists this ambivalence is seemingly resolved, in policy issues where they are strongly involved, by reducing the salience of whatever ambiguities or dissonances might exist in those data they see as supporting their most-favored policy.²⁷ On the other hand, those who give full recognition to ambiguities and dissonances in data have a problem of making these problems understood in contexts where simplification and polarization of themes are encouraged and where scientific hesitation and tentativeness are not part of the folkways of discussion.

(b) Science as a social institution

The role of "scientist" has certain recognized requirements, values, and freedoms. In addition, to be a "scientist" or "scientific" assumes that one has a rather specialized fundamental motivational pattern. The scientist's commitments to stable canons of inquiry, a goal of personal fulfillment through disciplined discovery, and a community of professional peers with whom he interacts in dialogues and takes as his reference are one important variant of what may be described as the "professional role." A "professional" defines his occupational activities around the satisfactory completion of activities which require that he bring to his immediate operating

²⁷ On this matter as it arises in current controversies over the impact of civil defense on American society, see Vestermark, loc. cit.

situation methods, traditions, and background data which exist independently of this situation and which have justification and legitimization beyond the immediate situation. Beyond this, the professional person must be motivated to place the standards of his expert calling above the immediate situation; regardless of the failure of a particular experiment or study, the loss of a courtroom case, or the death of a patient, the scientist, lawyer, or doctor values his performance ultimately in terms of the extent to which his behavior conformed to the practices of his independently existing profession. In doing this, he behaves in a way which transcends any particular situation of social exchange. Such behavior contrasts sharply with the particularistic and high prescribed behavior of a feudal lord, or the flexible and immediately adaptable behavior of the classic, ideal-typical entrepreneurial businessman.²⁸

Science and the formation of communities of scientific discourse require institutionalized processes for defining contributions to knowledge and characteristic patterns of "situationally transcendent" motivation as a precondition to entering science. Within these general frameworks which guide communal and individual scientific activity, the scientist must be able

²⁸ See the discussion in Talcott Parsons, "The Professions and Social Structure," in his Essays in Sociological Theory (Rev. ed.), Glencoe, Ill.: The Free Press, 1954, Chapter II, pp. 34-49. Of course, the similarities between the motivation required socially to be a professional and that required to engage in modern business activity should not be neglected. If Max Weber's thesis is correct, the motive to maximize capital accumulation as an end in itself through a secular version of the religious idea of "calling" is a necessary (although not sufficient) condition of capitalistic entrepreneurship. See Max Weber, The Protestant Ethic and the Spirit of Capitalism, (transl. by Talcott Parsons), New York: Charles Scribner's Sons, 1952 ed., especially Part I and the "Author's Introduction."

to define certain areas or problems as being domains within which he can meaningfully work as a scientist. Here the external world viewed by the scientist--whether it is social-behavioral, physical in the non-organic sense, or biological--is fundamentally different from the world viewed by the theologian, the prophet, the magician, or the poet. With the growth of an increasingly complex society in the West, and a new group of institutional possibilities and needs, a domain of "natural philosophy" arose. In this domain, phenomena of the natural world became objects of curiosity and inquiry which were, through stages, detached from the necessity to place the natural world in relation to a more inclusive metaphysical world. From the nascent professions, represented by the teachers, lawyers, systematic theologians, and emerging medical and mechanical practitioners of the Middle Ages, came groups of men who sought to understand natural phenomena in terms of their own laws and characteristics. Initially, these men concentrated on the phenomena of the biological and non-organic physical worlds.²⁹

²⁹See Edgar Zilsel's suggestive "The Sociological Roots of Science," American Journal of Sociology, Vol. 47 (January, 1942), pp. 554-562. On the growth and institutionalization of modern science, with special reference to the social order of immediately pre-industrial and industrial society in the West, see Merton, op. cit., especially "Science and the Social Order" (Chapter XV, pp. 537-549); "Science and Democratic Social Structure" (Chapter XVI, pp. 550-561); "Puritanism, Pietism, and Science" (Chapter XVIII, pp. 574-606); and "Science and Economy of 17th-Century England" (Chapter XIX, pp. 607-627). The emergence of a self-conscious class of intellectuals in Western society is discussed in Mannheim's "The Problem of the Intelligentsia: An Enquiry into Its Past and Present Role," in Karl Mannheim, Essays on the Sociology of Culture, (Ed. by Ernest Mannheim and Paul Kecskemeti), London: Routledge & Kegan Paul, Ltd., 1956, pp. 91-170.

While the social-behavioral sciences emerged somewhat later than the physical sciences, they now form self-conscious, coherent professional communities of discourse. Just as the physical sciences abandoned an overriding pressure to place natural phenomena in a meta-physical or theological cosmology, so the social-behavioral sciences have moved away from one of the principal concerns surrounding their birth--a concern for human and social perfectability which stimulated the social philosophers of the Seventeenth Century and Eighteenth Century European Enlightenment, and which is reflected in such diverse Nineteenth Century writers as Marx, Comte, Freud, Darwin, and Spencer. As behavioral scientists have sensed that the data of human society can have the same "objective" status as the data of the non-organic physical world, psychology as a discipline has differentiated away from philosophy, anthropology has ceased being another dimension of historical or zoological studies, and sociology no longer can be called "social ethics." The peculiar subjectivity which seems inherent in using human observers to define and analyze data on human subjects has created a strong impulse within the social-behavioral science community to avoid "mentalistic" terms such as "thought" and "idea"--in psychology, "Mind gave way to behavior,"³⁰ and behavior became the subject of "operational" study. Thus, the desire to make non-normative statements about human behavior, behavior viewed as the resultant of individual processes or social interaction, coupled with the problem of avoiding the subjectivity of human data, has established a self-conscious and self-generating pressure among behavioral scientists to avoid implicit moralizing or uncritical estheticism in the formation of concepts, theories, and statements of fact.

³⁰ Edwin G. Boring, "The Dual Role of the Zeitgeist in Scientific Creativity," in Philipp G. Frank (Ed.), The Validation of Scientific Theories, Boston: The Beacon Press, 1956, pp. 204-217, at p. 208. For a consideration of the interactions between science as an institution, and ideology and social process, see Henry Guerlac, "Science During the French Revolution," pp. 171-189 of the same volume.

In psychology, therapeutic and "intervening" functions have been localized within the role of the clinician, while the experimental psychologist concerns himself with the accretion of stable data on behavior, seen narrowly or broadly, from a laboratory or a "field" vantage point. The sociologist somewhat embarrassedly recoils from characterizations of the early history of his field as the era of "Drink, Drains, and Divorce," and now emphasizes the role of sociology in creating data and forming theory about the functioning of groups or social structures. If he studies the social problems of juvenile delinquency or alcoholism today, for example, he will generally note that his researches seek to advance general knowledge of the mechanisms or institutions of social control and deviance.

At any particular stage of knowledge, scientific work results from both scientific motivations and scientific institutions. Research interests for each generation of scientists are affected by the state of available knowledge, the institutionalized process of innovating within each discipline, the collection of subtle cues defining prestigious research within the discipline, and pressures impinging upon the discipline from outside its institutional boundaries. The decision by a scientist to engage in particular research projects or assume his role of "scientist" is a result of the interaction between the individual scientist's definitions of relevance and the criteria of relevance and method presented to him by his discipline in its current state. In the end, it is always the individual scientist who labors and creates. Yet, the decision to define and engage in particular research tasks is made with reference to an institutionalized scientific process, which itself is the result of historical processes, and which perpetuates the accumulation of data, theory, method, and insight from generation to generation.

(c) Civil defense and post-attack research

Through a variety of institutional channels within the behavioral science disciplines, ways are evolving for systematically attempting to

preserve the scientific perspective as behavioral scientists enter research areas which bear upon social problems or policy matters. Such groups as the Society for the Psychological Study of Social Issues, within the American Psychological Association, focus the attention and interests of psychologists on a broad range of problems. Contrastingly, fields of research emerge which focus the attention of varieties of social researchers on particular problem areas significant to the contemporary society. The specialty interest area of disaster research, by focusing on events which upset stable processes within social systems, thereby produces studies which illuminate social and individual requirements for adapting to change over a broader spectrum.³¹

There seem, nevertheless, to be several special problems in gaining an adequate understanding and sympathetic acceptance among behavioral scientists of the magnitudes and pitfalls implied in undertaking research on post-attack social phenomena or research which could be utilized in civil defense planning. It is immediately obvious, of course, that to think about this kind of research involves one in the analysis of possible present and future American responses to the current environment of international conflict. While research can be devised which helps to illuminate the structure and process of this conflict and America's place in it, some scientists seem to feel that doing such research requires them

³¹The development by several groups of systematic behavioral science research programs and program prospectuses, outlining research of immediate social significance, reflects a contemporary effort to direct the expertise of behavioral scientists toward the production of socially significant and useful scientific information, and away from the direct expounding of preferred policies. Several of these programs are discussed briefly later in this essay.

to take a particular stand on how America should conduct that conflict. What seems rather infrequently realized is that basic knowledge about conflict can be done by the behavioral scientist without having to commit himself to a particular policy, and that basic understanding of conflict may be the greatest contribution the behavioral scientist can make toward guiding conflicts to solution.³² It is at this point, however, that the sheer magnitude of the present tension and the possible consequences of it exert on some behavioral scientists an irresistible pull to take sides on policy. To think meaningfully about the response the American social system might make to massive attack immediately requires one to begin thinking globally about present and future stress in American society. For some, it is extraordinarily difficult to imagine stresses of the magnitude of a massive attack, and to develop the conceptual schemes requisite to dealing with them, without feeling that this intellectual task has now made the full meanings of attack possibilities much clearer and vivid, and has therefore required one to do something about these possibilities.

In addition, working with civil defense-related research brings one to a new understanding of the possible future meanings of civil defense in American society. In this new understanding, civil defense organizations emerge as doing more than merely preparing hardware systems to meet an hypothetical attack; they become, rather, part of the central means for organizing and guiding large-scale responses to stresses in the civil population before, during, and after massive attack. Thus, these organizations emerge as central tension-management systems in an American society faced with

³²See such journals as the Journal of Conflict Resolution: A Quarterly for Research Related to War and Peace. This Journal is published by the Center for Research on Conflict Resolution at the University of Michigan, Ann Arbor.

continuing international crisis. Can the behavioral scientist do research which will better illuminate the possible workings of such tension-management systems, especially in the post-attack period? Can he provide behavioral and cultural data which will suggest the guidelines and limits for civil defense's functioning in consonance with American democratic values and institutional pluralism? The issue, from a scientific point of view, is not that "civil defense is inherently anti-democratic" or that "civil defense is expropriating too many functions of social control." Instead, a more scientific examination of the emerging place of civil defense in American society would focus on the relations that now exist or may exist between civil defense and other sectors of American social life, for the purpose of evaluating its impact and enabling the policy-maker to think more directly about the relation between the objectives of civil defense programs in the context of larger national security objectives and even more comprehensive societal values.

The present seeming ambivalence of the behavioral science community toward social problems, an ambivalence characterizing the present state of evolution of this community, enables post-attack research and civil defense-related research to put an especially intense pressure on the behavioral scientist. The scope of the analytic problems involved in satisfactorily addressing the problems represented by the possibility of American society having to endure a massive blow requires the scientist to address theoretical problems for which he may feel unready, and to solve complex problems of empirical measurement. Such problems may seem premature for his state of the art,³³ while giving him a fuller glance into a horror that he had

³³ This concern is seen in Merton's comment on the necessity for "theories of the middle range" in sociology:

"Like the social scientist who errs in thoughtlessly comparing himself with the contemporary physical scientist because of the accident that they both happen to be alive at the same instant in history, so the informed public, and strategic decision-makers in that public, often err in appraising social science, once and for all, (Continued on next page)

heretofore not fully imagined. Similarly, analyses of the possible relation of evolving civil defense organizations to American social structure require a level of approach which drives the analyst into thinking about large scale social processes in modern America. If he has not worked out his analytic position fully, or if he finds impressionistic,

³³ (Continued from page 108) on the basis of its present capacity to solve the large and urgent problems of society which press in on all of us. The misplaced masochism of the social scientist and the inadvertent sadism of the public both result from the same fault: failure to see that social science, like all civilization, is continually in the process of development and that there is no providential dispensation providing that, at any given moment, science must be adequate to the entire array of problems confronting men at that moment. Historical perspective might enable scientist and layman alike to see these facts of repeated experience in their fitting proportion. Otherwise it is as though the status and promise of medicine in the seventeenth century had been forever judged by its ability to produce, then and there, a preventive or cure for cardiac diseases....

"This emphasis on the disproportion between the practical problems sometimes assigned the sociologist and the state of his accumulated skills and knowledge does not at all mean, of course, that the sociologist should not work on researches relevant for urgent practical problems, that he should deliberately seek out the pragmatically trivial problem. The emphasis is intended only to re-establish a historical sense of proportion. The urgency or immensity of a practical social problem does not entail the assurance of its solution....

"From all this it would seem reasonable to suppose that sociology will advance in the degree that its major concern is with developing theories of the middle range and will be frustrated if attention centers on theory in the large. I believe that our major task today is to develop special theories applicable to limited ranges of data--theories, for example, of class dynamics, of conflicting group pressures, of the flow of power and the exercise of interpersonal influence--rather than to seek at once the 'integrated' conceptual structure adequate to derive all these and other theories."

Merton, op. cit., pp. 7-9.

metaphorical theories of American social process attractive, he can generate an anxious image of a precariously balanced American society under stress. Analysts who see American social process essentially as the unresolved collisions of interest groups are especially liable both to give an inadequate interpretation of the impact of civil defense on American society, and to allow this interpretation to excite anxieties.

Throughout his work on research problems which bear upon social issues, the behavioral scientist may find it useful to consider his perspective of social process as possibly being limited by his role as a member not only of society at large but also of an intellectual community. This may be particularly important when the professional norms of this intellectual community do not yet clearly specify the attitudes of professionals to value-implicated questions.³⁴ The complexity of American society as a subject of tension-management institutions and as a possible target for massive attack tests both the techniques and professional knowledge of the behavioral scientist, and his ability to remain emotionally detached. The research area forces one into a wider perspective toward the content, possibilities, and requirements of his research, and

³⁴White has recently provided a critique of what he finds to be an "ideology" which characterizes a significant group of American intellectuals. He suggests the relations between this ideology, and its variants, and the place of the intellectual in American society. It would be of interest to apply White's point of view to current attitudes of those who speak for "intellectuals" on the issue of civil defense. See Winston White, Beyond Conformity, New York: The Free Press of Glencoe, Inc., 1961.

simultaneously challenges an easy separation between research questions and policy issues and decisions. As a result, the ambiguities of being a behavioral scientist today have unusual freedom to appear and to press the behavioral scientist to come to terms with them. As he faces these ambiguities, the American behavioral scientist may experience competing pressures from his personal motives, scientific commitments, and placement in a society faced with great challenges. Over some of these pressures, he will have little control. It may be helpful to him, however, if he can determine which of the pressures result from the dilemmas and ambiguities of being a behavioral scientist.

(2) Some General Features of the American Social System Which
Are Especially Relevant to Its Post-Attack Social Characteristics

The theme of Section II of this essay has been that attempts to define the nature of post-attack society have sometimes bended toward fantasy speculations and images, and sometimes toward projections and extrapolations made from seemingly relevant existing knowledge. But the section has been less directed toward specific criticism of the various conclusions or orientations which have been held about post-attack society, and more toward a general examination of what it implied in the scientific analysis of post-attack society. The sharp divisions on the linked questions of the nature of post-attack society and the general possibilities of analyzing it have made it useful, however, to consider some of the specific approaches which have been taken toward these questions. In considering these questions, it has seemed that there were a variety of ambiguities in defining the precise address scientists could take to post-attack research, together with substantial problems in the use of scientific evidence to support particular conclusions about post-attack society. Some understanding of why this should be peculiarly the case for post-attack research was sought by looking at the place of "social problems" in the current institutional structure of the

behavioral sciences, and by considering the ways in which post-attack research and other civil defense-related research may heighten a certain contemporary ambivalence about social problems in the behavioral sciences.

Before turning now to the development of a scheme for analyzing American society and its possible phenomena following a massive attack, it is helpful to take a general overview of what the behavioral sciences can say about the present state of American society. While there are certain ambiguities in the address behavioral scientists have taken toward American society as it is changing and as it presents problems of public policy, there is within sociology, psychology, economics, the study of political processes, historical studies, and anthropological analyses of America a certain body of emergent findings and reasonably verified assumptions about the kinds of institutional life and behavior which are characteristic of American society. Many of these propositions about American society are well known to the intelligent layman. Others represent the application of particular disciplinary perspectives to complex American social reality. Few are distinctively dependent on the insight of one particular behavioral science to bring them into focus. Many can be put in rather simple and clear-cut terms, even though there would be considerable debate about how to circumscribe their meanings and spell out their implications. Indeed, the simplicity of some of these propositions is not always congenial to the careful mind, yet without explicitly stating some of the matters upon which there is relatively high consensus, they can be forgotten in the process of thinking about American society. In the discussion of what might happen if American society were attacked on a large scale, it is sometimes especially easy to forget these propositions. Yet, a knowledge of at least some of the more central propositions about American society forms part of the necessary underpinning for taking an

approach toward systematically projecting American reactions and social processes in the aftermath of a massive attack.

As a form of society, American society is structurally complex, and spread over a large geographical area. As a form of industrial society, America exhibits a highly differentiated system for the allocation of societal resources toward production, consumption, and the meeting of both individual and group life needs. As part of the general division of labor in society, there is a system of ranking individuals socially, in which there exists a relatively greater pressure toward the achievement of social status, and relatively lesser emphasis on the stable living out of lives in inherited, status positions.³⁵ An important characteristic of American society, as with other industrial societies, is that social status tends to be closely tied to occupational roles, and that vertical movement in the social hierarchy and horizontal movement across the regional and cultural variations in the society is thereby facilitated.

America grew through the displacement of relatively undifferentiated, tribal cultures by successive waves of migration to and within the North American Continent. As ethnic differences increased and as the Industrial Revolution spread, with its rural-to-urban migration and increased opportunities for complex division and allocation of roles in society, it was possible to think of American society as being subject to internal strains brought about by the pressure to preserve consensus on basic values. But, while there is an ultimate uncertainty in the values of

³⁵ For a general sociological overview of American society in mid-twentieth century, see Robin M. Williams, Jr., American Society: A Sociological Interpretation, (Second Ed., Rev.), New York: Alfred A. Knopf, 1961. A comparative description and theory of social stratification based on the functional differentiation of society and the value structure of society are to be found in Bernard Barber, Social Stratification: A Comparative Analysis of Structure and Process, New York: Harcourt, Brace and Company, 1957.

a society which provide for only the opportunity for each individual, within broad limits, to define a free and fulfilling life for himself, there has nevertheless been a striking degree of consensus over values in American society. Part of this has resulted from the institutionalization of an Anglo-Saxon, Common Law tradition in the organic procedures of the American polity, but part has been the result of an even broader pressure toward the acceptance of what can be described only roughly as a "middle class, bourgeois way of life." The decline of ethnic immigration has accentuated this persisting acceptance of middle class norms with accompanying aspirations toward living the life they imply.³⁶

Many Americans tend to identify with middle class values, even though they may not be members of that somewhat difficult-to-define class position.³⁷ It seems evident that a number of other characteristics

³⁶ Minott, notes, among veterans' patriotic organizations, a shift away from earlier emphases on Americanism as Americanization. These organizations have been especially sensitive to structural strains within American society. See Rodney G. Minott, Peerless Patriots: Organized Veterans and the Spirit of Americanism, Wash., D.C.: Public Affairs Press, 1962, especially Chapters V-VII, and IX.

³⁷ A general discussion of recent problems in precisely defining the American social class structure is Milton M. Gordon, Social Class in American Sociology, Durham, N. C.: Duke University Press, 1958; see especially the discussion of the difficulties encountered in using Americans' perceptions of their class position as the criteria of their class position: pp. 193-202. For a general selection of essays on various aspects of the problem of defining the placement of Americans in social classes, see also Reinhard Bendix and Seymour M. Lipset, (Eds.), Class, Status and Power: A Reader in Social Stratification, Glencoe, Illinois: The Free Press, 1953, Section III, "Differential Class Behavior," and Section IV, "Social Mobility in the United States." Hollingshead provides an important discussion of differential life opportunities based on varying social class positions in a small community, and the ways social problems arising from these differences are mediated, in August B. Hollingshead, Elmtown's Youth: The Impact of Social Classes on Adolescents, New York: John Wiley and Sons, Inc., 1949.

of American life are also related to the production of relatively stable political behavior. There seems, for example, to be a surprising lack of comprehension among the general citizenry of many of the more convulsive issues which are violently debated in the articulate sector of society, while groups which might assail established democratic procedures are frequently controlled by individuals with greater appreciation of needs for compromise and adjustment of differences.³⁸ Since the early days of the American Republic, observers have noted the distinctive proliferation

³⁸ As this applies to perceptions of the threat of domestic Communism, in the 1950's, see Samuel A. Stouffer, Communism, Conformity, and Civil Liberties: A Cross-Section of the Nation Speaks Its Mind, Garden City, New York: Doubleday and Company, Inc., 1955, especially Chapter 3 ("Is There a National Anxiety Neurosis?", pp. 58-88), and Chapter 2 ("Are Civic Leaders More Tolerant Than Other People?", pp. 26-57). Regarding some of the continuities, controls, and shifts in political extremism in American society, see Seymour M. Lipset, Political Man: The Social Bases of Politics, Garden City, New York: Doubleday and Company, Inc., 1960, Chapter 4 ("Working-class Authoritarianism," pp. 97-130), Chapter 5 ("Fascism'--Left, Right, and Center," pp. 131-176), and the three chapters of "Part III," on "Political Behavior in American Society." He also discusses the processes which guide and constrain politics in certain trade union environments, in Chapter 12 ("The Political Process in Trade-unions," pp. 357-399). In a forthcoming paper on "radical right" movements in recent American history, Lipset discusses some of the characteristics of the membership and audience for these movements, and suggests the integrative ties between these potentially highly dissonant groups and the larger American political and social structure. See Seymour M. Lipset, "Coughlinites, McCarthyites, and Birchers: Radical Rightists of Three Decades," (to be published in the revised edition of Daniel Bell (Ed.), The New American Right), Berkeley, California: May, 1962, mimeographed. Analysts have sought sources of political extremism in groups which become marginal during processes of structural change within a society; shifts in the position of the American small businessman have been associated with tendencies toward expressing rightist extremist attitudes on certain issues. See Martin Trow, "Small Businessmen, Political Tolerance, and Support for McCarthy," American Journal of Sociology, Vol. LXIV, No. 3 (November, 1958), pp. 270-281. But see the discussion of linking processes between the small businessman and the larger economic and political order, particularly as small businessmen make accommodations to their situation, in David Rogers and Ivar E. Berg, Jr., "Occupation and Ideology: The Case of the Small Businessman," Human Organization, Vol. XX, No. 3 (Fall, 1961), pp. 103-111. Samuel Lubell, (Continued on next page)

of opportunities for participating in voluntary group and associational life. While these associations draw heavily from a broadly-defined middle class membership, they nevertheless provide non-official or semi-official opportunities for advocating a wide variety of programs and activities in American society, and an enormous sphere for bringing heterogeneous interests into interaction.³⁸ The vast complex of voluntary associational life, with both its membership and program overlaps and its colliding goals, forms a key characteristic of American social pluralism. Yet the basic commitment of most of these organizations to what is perceived to be a fundamental American value consensus means that they are involved in organizational processes which tend toward social integration and not disintegration. This would seem to hold for religious institutions, as well as for secular organizations.

³⁸(Continued from page 115) in Revolt of the Moderates, New York: Harper and Brothers, 1956, provides a suggestive interpretation of current American political trends, from the vantage point of one who combines journalistic acuity with certain key perspectives of the behavioral scientist.

³⁹For a recent general description of characteristics of members of voluntary associations in America, and some suggestions on the place of these associations in American life, see Murray Hausknecht, The Joiners: A Sociological Description of Voluntary Association Membership in the United States, New York: The Bedminster Press, 1962. On the organizational dynamics of a prominent American voluntary association, see David L. Sills, The Volunteers: Means and Ends in a National Organization, ("A Report of the Bureau of Applied Social Research, Columbia University"), Glencoe, Illinois: The Free Press, 1957.

It would be misleading, of course, to emphasize only the features of American society which seem conducive to social integration. One significant structural shift has entered fantasy and folklore in the image of "Main Street": the small town is under increasing pressure as mobility toward larger urban centers and declining economic functions have stabilized or cut the growth of the small community.⁴⁰ This is but one side of a continuing series of linked social problems which attend one of America's most durable characteristics, its large scale internal migrations, centering especially in more recent years on movements from areas with low capacity to absorb surplus population toward areas of economic and social expansion. Accompanying this movement and the increasing structural differentiation of society has been an apparent shift in family structure. This shift has begun with the loss of the rural and ethnic bases for old, large extended-family forms of family structure, and has been especially evident among upper middle class, professional families, whose mobility and independent sources for social legitimation have tended to sever them from large, collateral familism. For these groups there has emerged among analysts a model of the small, nuclear family living in

⁴⁰ An unusual case study of changes in the position of small towns, based on extensive field work and observation of a small Northeastern United States rural community, is Arthur J. Vidich and Joseph Bensman, Small Town in Mass Society: Class, Power and Religion in a Rural Community, Princeton, New Jersey: Princeton University Press, 1958.

relative isolation from kinship ties.⁴¹ An important problem becomes to determine the ways in which other institutions have taken up family functions, and the extent to which kinship ties do still provide significant resources for individual living. It is perhaps not unfair to say, however, that such changes as the rural-to-urban shift and changes in family structure lie at the heart of a persistent American concern, expressed in both the popular culture and more sophisticated humanistic and scientific literature, about the individual who is genuinely committed to group life yet continually unsure of his own unique identity.

This brief overview of salient features of contemporary American life has not presented a discussion of continuing problems of social control or deviance, of which the problems of mental illness, racial integration, the place of the aging in society, and certain persisting limitations on allocation of social resources are examples. A more comprehensive overview would also treat such behavioral changes as shifts in the meanings and processes of American Federalism, and the growth of a significant, permanent national security establishment. The emphasis here has been, rather, on persisting generally-defining features of the whole society and its legitimized institutions. These features form the implicit as well as the explicit basis for the ways in which an American analyst often approaches American society. While the commitment of Americans to

⁴¹ See the essays "Age and Sex in the Social Structure of the United States" (Chapter 5, pp. 89-103) and "The Kinship System of the Contemporary United States" (Chapter 9, pp. 177-196) in Parsons, op. cit. Although there are some methodological problems in their book, Ogburn and Nimkoff provide a broad array of data on recent changes in the characteristics of the American family. W. F. Ogburn and M. F. Nimkoff, Technology and the Changing Family, New York: Houghton Mifflin Company, 1955. Erikson offers insight on the interaction between contemporary American family structure and significant themes in the development of individual personalities in Erik H. Erikson, Childhood and Society, New York: W. W. Norton and Company, Inc., 1950. See "Part III: The Growth of the Ego" and Chapter 8 ("Reflections on the American Identity," pp. 244-283).

a distinctive set of values or to the "American Dream" may be only incomplete⁴², it seems possible to say that there is an extraordinary acceptance of a range of basic institutions and values, that this acceptance exerts pressures toward controlling disruptive implications of widespread processes of internal change in the society, and that this therefore forms part of a resource base for responding to additional stresses in the future.

In considering the capacity of various levels of American social life to respond to a massive attack, it will be necessary to consider the strengths as well as the vulnerabilities of the society. The vulnerabilities can be accentuated by the imperfect present-day management of social problems, but they can be lessened by the integrative effects of whatever institutional and individual human resources for adaptation result from America's complex pluralism. A scheme for analyzing American social life as a target for massive attack must take overt recognition of the inconsistencies, ambiguities, and unsolved problems of the society. But there is an equal need to try to determine in what ways its possible resilience can be discovered. It has seemed useful, therefore, to try to look at the kinds of broad "facts" which have shaped the conceptual approach to the analysis of American behavior, social life, and institutions which will be outlined in the final Section of this essay. These facts reveal

⁴²For example, certain kinds of blue collar workers have sharp adjustments to make in the levels of their aspirations, as they mature within a constraining work environment. There may be functional similarities between these adjustments and the kinds of accommodations Rogers and Berg, *supra*, discuss. Ely Chinoy, Automobile Workers and the American Dream, Garden City, New York: Doubleday and Company, Inc., 1955, especially Chapter 9 ("The Chronology of Aspirations," pp. 110-123). A highly suggestive methodological insight into the study of possible differences among American values is offered in Florence R. Kluckhohn and Fred L. Strodbeck, Variations in Value Orientations, Evanston, Illinois: Row, Peterson, and Company, 1961.

a varied structure, with inconsistencies, problems, and strengths. Thus, a description or conceptual analysis of American social life must cope with a complex reality, and any analyst addressing himself to the task of describing the impact of massive attack on American society, for the purpose of post-attack planning, must ask whether his approach has a good probability of pointing to the social characteristics which will be relevant to assessing American capacities for withstanding a massive blow.

III. A Conceptual Approach to Possible Post-Attack Social Phenomena in America

A. Some Uses of a Unified Conceptual Approach

There has been some discussion already in this essay of the problems implied in using a behavioral science perspective to order research areas which require many levels of approach and willingness to sort out the scientific issues in complex questions which bear upon policy. The challenges become especially great when a whole society becomes the target of analysis, for a way must be found to address economically yet relatively completely the various levels on which behavior can be seen to be organized in a social system. It has been suggested that one of the limitations upon disaster research as it might apply to assessing the capacities of the American social system to withstand massive attack has been its focus on the phenomena and parameters of the disaster, and not upon the whole structure of social processes into which the disaster intrudes. It is not sufficient merely to describe emergency forms of social organization which arise in a disaster, or the ways in which latent structures become activated to withstand and cope with stress. To take a full address to the problems of massive attack and disaster, a meaningful way must be found for describing the placement of disaster events

within the levels of a complex social system, and the ways ultimately that disaster translates from specific incursions into particular levels of the social system to a total historical process summing toward a changed social system which may have permanent alterations in the interactions of its functional components.

These analytic problems have been faced by other researchers who have tried to apply systematic analysis to complex research areas on contemporary society and its possible problems. It is stimulating and informative to look at ways in which these other researchers have dealt with the problems of cutting into research areas which are at the same level of complexity as the present area of post-attack social phenomena. Even a quick look at some of the efforts makes it clear that the behavioral scientist must be very tentative in his claims that he can develop schemes which will, at the present time, give optimum effectiveness and sophistication in sorting a global problem area. It is this realization which is behind the desire in this present essay to lay out a conceptual approach toward post-attack social phenomena which is seen as tentative, heuristic, and partly projective-speculative. The value will be ultimately as it enables the researcher to approach the substantive issues of research on post-attack social phenomena. To claim more for it would be naive about the present state of the behavioral sciences.

In recent years, the Institute for International Order has sought to develop a series of research program outlines on "research for peace." Several extremely comprehensive and ambitious research programs have been presented by leading contemporary scholars and scientists, around such topical areas as "Economic Factors Bearing Upon the Maintenance of Peace," "The International Rule of Law," "National and International Decision-Making," and

"Communication and Values in Relation to War and Peace."⁴³ In entering the complex area of defining research to understand forces contributing to or alleviating international tensions, these researchers have chosen a number of central, topical areas. Particularly in view of the legal, economic, and social psychological problems of considering conflict within and among a number of sovereignties, it would be premature to unite such a research program in a grand scheme of analysis. Clearly, deep and central cuts made through a number of persisting substantive areas are much more to the point. In defining their approach to breaking the problems of national and international decision-making, Synder and Robinson emphasize the diversity of their approach:

Our position is that a wide range of activities, from Copernican shifts in major perspectives on human behavior to the use of highly refined tools on limited phenomena, is necessary. We shall, then, advocate a broad conception of research, one which includes:

- (1) the identification and comparison of existing theories;
- (2) theory building and conceptualization;
- (3) development and employment of new research tactics;

⁴³ The Institute for International Order, 11 West 42nd Street, New York 36, New York. These reports developed from a 1959 meeting at Princeton, New Jersey, sponsored by the Institute. The individual research programs are undated.

(a) Kenneth E. Boulding, Emile Benoit, Phillips Foster, Bert T. Hoselitz, W. S. Thompson, and Lawrence Witt, Economic Factors Bearing Upon the Maintenance of Peace: A Report to the Committee on Research for Peace, Program of Research No. 2, (in two parts).

(b) Arthur Larson, The International Rule of Law: A Report to the Committee on Research for Peace, Program of Research No. 3.

(c) Richard C. Snyder and James A. Robinson, National and International Decision-Making: A Report to the Committee on Research for Peace, Program of Research No. 4.

(d) Ithiel de Sola Pool, Communication and Values in Relation to War and Peace: A Report to the Committee on Research for Peace, Program of Research No. 5.

- (4) acquisition of new knowledge;
- (5) stock taking -- consolidation and codification of present knowledge, propositional inventories;
- (6) empirical mapping -- observations, descriptions, and taxonomies.

There are several reasons for a combination of rigor and eclecticism. First, it is not at all clear (at least to us) where all the crucial cut-in points for theory and research lie. There are troublesome questions of levels (generality of phenomena and explanation) and units of inquiry. Of these, some require analytic operation, i.e., the invention of fictional constructs and classifications, but others seem to require initial observation and first order definition or characterization. Those who distrust highly general theories in the relatively uncharted realm of international relations are justified -- to an extent. Unless units of behavior or action or interaction are clearly specified, general theory may lack an empirical anchor. On the other hand, it is possible to work at higher levels of generality once the proper underpinning has been provided -- as it was, say, in psychology through thousands of cumulative observations long since taken for granted. Perhaps the most obvious example of the problem of levels and units has involved moving back and forth between the individual and the group or social organization entity we call the nation. Most of us seldom fall into the fallacy of misplaced concreteness any more, but in the disillusionment over such concepts as 'national character' analysis we may have thrown aside potentially useful approaches. ...

A second reason is that the usual barriers to reliable knowledge about human behavior seem compounded in the study of international relations. Sophisticated observers and critics stress complexity, indeterminacy, accident, and non-rational or irrational elements. ... The implication is one of relative disorder, of continual fluidity, and of the problematical nature of policy responses. The question here is how much of this is due to the limited number of crude observations and to the lack of an established conceptual order. In other words, our descriptive knowledge is inadequate and therefore judgements concerning what is and what is not amenable to systematic research may often rest on flimsy evidence. ⁴⁴

⁴⁴ Snyder and Robinson, op. cit., pp. 14-15. Emphasis in the original.

Many of these points, which were made with reference to the complexities of defining research needs in the area of international relations, could be applied to the problem of defining a post-attack behavioral research program. Yet the task of defining post-attack behavioral research is simultaneously more easy and more difficult. It is easier in that the subject matter focus is a whole society and its responses, as levels of system and behavior, to a particular form of threat. The subject matter is therefore automatically unified, around the study of attack and response in a particular social system, and there is the added advantage of the analyst's having relatively easy access to previous considerations of American behavior and society. For this society above perhaps any other, there is systematic social data available. But that which is simplifying about defining post-attack research on this society is also the source of its difficulty and complexity. To examine the ways in which a massive attack could produce short-term and long-term social effects, means must be found of ordering the wide range of potentially available data around some conception of the ways in which the components and levels of a social system interrelate. This immediately forces one to take some theoretical or generally analytic focus toward the whole social system, and, when one is examining particular data, to make projections and extrapolations about hypothetical, future-time behavior. Furthermore, the particular kinds of substantive areas that will be chosen are at least partially dependent on the general orientation taken to the whole social system, for most general orientations imply that there are certain kinds and levels of behavior and social process which are especially significant and interesting. In orienting himself to both general social system and particular substantive behavioral projections, the analyst pushes beyond the particular state of his science. He must do without the particular comfort of the eclecticism described by Snyder and Robinson, the comfort of being able to turn to another way of looking at imprecisely defined problem areas when the first cut seems exhausted. In studying post-

attack behavior, the analyst has a much clearer idea of the general nature of his problem area, while simultaneously lacking some of the tools which will enable him to make potentially the most fruitful discriminations among the levels of his problem and toward particular projections about post-attack society. Thus, he must turn especially to Focus (2) and Focus (6) of the Snyder-Robinson outline, in the early stages of his thinking about the particular analytic problems of describing post-attack social phenomena, while moving toward Foci (3), (4), and (5) as he begins substantive projections.

Loomis, in his work "Toward Systematic Analysis of Disaster, Disruption, Stress and Recovery," has explicitly recognized the need for a unifying conceptual scheme in approaching post-attack behavioral research needs.⁴⁵ Using his "Processually Articulated Structural Model" for stating the elements, processes, and conditions of action in social systems, he suggests how a wide variety of research studies on disaster and recovery can be seen as centering around a number of important functional categories of action in the social system. Especially in the disaster and recovery context, however, it appears that his "model" fails to specify the interrelations of various levels of action and process elements; he meets part of the requirement for a coherent conceptual scheme for analyzing social process as the target of disaster and recovery processes, in that he focuses on the persisting nature of social processes in any social system. But his model is incomplete, in that his "structural-functional categories" and his "elements" are not described in a way which shows how they might sum or integrate into a social system. In fact, it could be said that precisely because his model does not show interrelations of levels and the resultant total social system, it is not a model at

⁴⁵Loomis, loc. cit. See Footnote 1.

all, but an extremely useful list of basic social system analytic categories or, as he denotes them, elemental processes.⁴⁶ This impression is supported by the extremely wide empirical range of the substantive studies which he proposes under the "structural-functional category" associated with each elementary process. These go from quite precise tests of hypotheses which have a history in behavioral science literature independent of disaster research, to broad suggestions as to possible conditions associated with the recovery of social systems from disaster. This is not to say that there should not be an attempt to tap as wide a range of behavioral science perspectives as possible, in undertaking research on disaster, post-attack behavior, and recovery. Rather, it is only to suggest that attempts should be made to state the interpenetrations and interrelations of the various substantive studies that can be defined.

The immediate goal of the conceptual approach to be taken here toward post-attack society is to develop a scheme which can be used to scan the present state of the behavioral sciences for the purpose of developing a number of substantive, problem-oriented studies for projecting post-attack social phenomena. A scheme adequate to describing the levels of a whole system as target for massive attack can help to solve a number of questions regarding the allocation of limited research resources and time among a variety of possible research alternatives.

⁴⁶ Ibid., pp. 121-123.

(1) Assessing Criticality, and Research Ends

An important step toward solving the problem of selecting which research studies to do from among a range of research possibilities has been taken when the alternatives can be seen as less important or more important to the achievement of the ends of the research. This problem of deciding the degree of importance of each research study is the problem of deciding the degree of criticality of that study.

Criticality estimates for each study result from two different kinds of requirements. On the one hand, when there are limited resources available, it is clearly important to do studies which will illuminate the central functional processes in withstanding massive attack or system stress on each level of societal and behavioral vulnerability to massive attack. To have some notion of what constitutes a study of centrally relevant functional process, it is important to know the full range of possible functional levels in a social system, and to suggest their interrelations. This is a requirement which exists independently of any adaptive program which might be developed by civil defense authorities; as has been suggested earlier in this essay, part of the justification for any post-attack countermeasure system to deal with post-attack social phenomena will depend on the kinds of social phenomena which emerge as being crucial to survival or adaptation of individuals and groups. Sometimes social phenomena are crucial in that they would fatally hinder adaptation or survival if not dealt with by countermeasure systems; other times, these phenomena are crucial in that they represent or point to key reservoirs of adaptive behavior.

On the other hand, criticality of research studies depends at least partially on the stated ends of civil defense planners, insofar as this research program is to meet planning needs. If planners, legislators, and the American

public have clear ideas of what they think post-attack life will be like or should be like, these will influence the kinds of policy goals about which exploratory research might be done. For example, if it is a policy to utilize local community resources for constructing a post-attack public administration, then it will be desirable to study the kinds of formal and informal organizational resources (e. g., voluntary associational, religious group, familial) which may exist in the local community after attack. Here it is possible to see the carry-over of pre-attack commitments to American Federalism, "home rule," and "democracy" into imagined desirable features of the post-attack society.

There seems a significant overlap in these two influences on deciding the criticality of possible research, in that to know what is desirable in the post-attack world, the pre-attack planner will require some notion of what the range of feasible alternatives will be in the post-attack world. This depends upon his having a coherent conception of what the nature of the social processes will be upon which any adaptive program can be constructed. What may be feasible within the framework of pre-attack American values and goals may be infeasible in post-attack society, in the light of the functional behavioral processes that may be critical to the survival of individuals and groups. Insofar as the behavioral scientist can point to those processes which seem functionally critical to post-attack society, he supplies the knowledge of viable, critical post-attack social phenomena which form the civil defense planner's notions of what is feasible, desirable, and critical. But because he is addressing an attack against all levels of the social system, the behavioral scientist must be able to discriminate substantive research studies for each level, and take a comprehensive view of the varieties of functional process critical in the whole social system. Here a unified conceptual approach should equip him to make these crucial discriminations with more sophistication.

Criticality is thus influenced by two kinds of research ends. The first is the research end of the behavioral scientist: to study what is central to the functioning of a social system under massive stress. The second is the end of the planner: to achieve a desirable state of post-attack society. This desirable state of post-attack society requires the planner to have a notion of the key characteristics of the "recovered" society, but regardless of the values which operate to define his image of "recovery," this image will be crucially influenced by what the researcher can tell him to expect in the post-attack social world.

(2) Assessing Strategic Placement of Studies in the Unfolding of a Research Program

Will a study point not only to crucial processes for any given state and level of society, but also to other kinds of information which must be known, as the social system evolves over time, and as the effects of behavior on one level are felt on other levels? If a study suggests linkages between levels of behavior and social phenomena, or between one phase of a social level to another in time, it is possible to conceive of this study as being more strategic in the process of acquiring knowledge than a study which stands alone in level and in time. A strategic study is so placed in a research program that the doing of this study will imply the maximum probability of gaining knowledge in other sectors of the research program. Clearly, without some unified conception of what the available sectors for research will be, there are no ways of making the kinds of preliminary assessments of the scope of research studies which are required, in turn, to impute their strategicity.

It would seem that a study which is highly critical is also highly strategic, but such is not always the case. This is because the reference of criticality as a concept is to behavioral process and post-attack goals, while the reference

of strategicity as a concept is to the development of a research program designed to maximize production of important information of wide significance. If it is assumed, for example, that a massive attack on American society leaves a surviving population, and that these individuals are faced with emerging from immediate post-attack shock (if they are relatively removed from weapons effects) or from systems designed to shield them from weapons effects (as in the case of shelterees), it seems likely that they will confront a world of real terrors, stressful uncertainties, and many ambiguities regarding the next steps they should take. In order to provide coherent direction during the processes of large-scale emergence from shock or shelter, a number of "emergence leaders" may be required, to direct groups of varying size. These leaders may have special personality characteristics which equip them to lead emergence. If it is assumed, for the purposes of the immediate example only, that these personality characteristics are consonant with the American value system, then the problem of identifying and using emergence leaders is centrally important only for the times after attack when emergence processes are occurring. There seem few longer term requirements for emergence leaders; processes of societal rebuilding and recovery may, in fact, require leaders with quite different characteristics. Consider now another kind of study, the study of migrations outlined in Section I of this essay. Here, tendencies toward movement of populations across the society are considered and there is evidence both in terms of the American values and social pressures which are conducive to migration, and the dislocations in social structure brought about by disaster, that migrations may be a continuing problem in post-attack society. If resources for doing social research are scarce, what kinds of considerations would shape the final decision to undertake the study of migratory pressures instead of the study of emergence leaders?

This decision is more difficult because finding, training, and utilizing emergence leaders may be necessary to enable the surviving population to

move from immediate post-attack phases to later phases of societal reconstruction. The civil defense planner may therefore feel an especial need to develop a program of finding and training emergence leaders, and may feel a corresponding need for personality data on such individuals. Yet, if the goals of behavioral research are to illuminate longer-term social processes which may ultimately impede societal recovery, then some resources should be diverted to research on migratory pressures, because of the strong theoretical evidence that such pressures may reflect central integrative problems of the post-attack social system.

The answer to this particular choice dilemma may be already implied. Studies of the personality characteristics of emergence leaders may be less strategic than studies of migratory pressures, in that such studies offer less hope of acquiring a range of information about social phenomena across several different types of post-attack time phase. But, if it can be shown that without certain leadership roles during the period of transition from post-impact society to reconstruction, there can be no transition, then studies of emergence leaders become highly critical. Such a demonstration might come on theoretical grounds, which might show that emergence leadership with certain crucial characteristics is a prerequisite for later phases of post-attack social life. Or, the demonstration might come on the basis of civil defense policy imperatives, which might be built on the assumption that to restore high degrees of social integration preparatory to restoring an industrial society, maximum efficiency would be gained in utilizing emergence leaders with certain personality characteristics. In this particular example, theoretical and policy justifications for high criticality of emergence leadership studies are mutually reinforcing.

Real dilemmas of choice might arise, however, where there were conflicts between the alternative ways of imputing criticality. In the present study,

the dilemma results, rather, from the fact that a study can be of low strategicality but high criticality. If the additional theoretical justification for the high criticality of the emergence leadership study could not be advanced, then it would be difficult to reconcile the interests of the behavioral scientist with those of the civil defense planner urgently in need of behavioral science data and insight.

It is proposed here that maximum efficiency in research programs for illuminating social issues comes when it is possible to design a group of studies which have both high criticality and high strategicality. When this can be done, there is more to suggest that the interests of the scientist can be combined with those of the administrator and planner, than when studies are presented which have high criticality and low strategicality, or low criticality and high strategicality. When a study has high criticality but low strategic interest, it may become crucially necessary to make part of the criticality depend upon the study's narrow-range but intense theoretical interest for the behavioral scientist. When a study has low criticality but high strategicality, the planner-administrator may be the one who has to be convinced of the necessity of doing the study. One argument for convincing him may be the hunch that if the study were done, the broad theoretical or empirical scope of the study might lead to unexpected information which would point to highly critical research payoffs.

The possible dilemmas posed by the interaction of the dimensions of criticality and strategicality are suggested in Figure III-1. Since strategicality is partially dependent on criticality, this table must be seen as the array of the dichotomous possibilities of a dependent variable against an independent variable.

Figure III - 1

**SOME POSSIBLE PRACTICAL CONSEQUENCES OF INTERACTIONS BETWEEN
THE "CRITICALITY" AND THE "STRATEGICALITY" OF A STUDY
IN A RESEARCH PROGRAM**

		CRITICALITY OF INFORMATION: (on centrality of behavioral process, and/or, on relevance to policy goals.)	
		HIGH	LOW
STRATEGICALITY: (in strategy of behavioral research program; compre- hensiveness of study.)	HIGH	Greater chance of harmony of interest between researcher and planner	Lesser chance of harmony of interest between researcher and planner Scientist more likely to want study
	LOW	Lesser chance of harmony of interest between researcher and planner Planner more likely to want study	Greater chance of harmony of interest between researcher and planner

Since criticality can be a function of the behavioral science meanings and planner's ends for a given research study, the final decision to do a study of high criticality and low strategicality, or low criticality and high strategicality can turn on getting agreement between the scientist and planner on the degree of criticality of proposed study. But criticality now has a more refined meaning; in the past, the dimension which has here been called "strategicality"

has entered into quick, visceral decisions about what studies were important to do, along with considerations of centrality and relevance to policy ends. By separating out this dimension as far as it now seems possible to do so, it may be possible to gain a clearer idea of what is involved in the decision to choose from an array of studies. This becomes an important consideration when a large variety of studies, stated in terms which are roughly on the same level of generality, is presented for choice.

(3) Knowing the Degree of Closure and Comprehensiveness Achieved in Research

There are many areas of research interest in the behavioral sciences, and many of these are not closely related, even within a given discipline. This results from the disciplines' growth through a series of historical processes, and not by central design. As a result, when tapping into these disciplines, the chances for oversight are great if there are no ways for systematically scanning these disciplines for relevant content. When these disciplines are scanned for material and ideas relevant to the social effects of massive attack against a whole society, a second kind of opportunity for missing relevant research possibilities arises. If all levels of possible social phenomena are not considered, there may be only a partial selection of content and research possibilities from domains which are already lacking in systematic integration and closure.

If a scheme can be developed to state, in an integrated way, all the general levels upon which social effects of massive attack can occur, then this scheme orients a search of the existing state of the behavioral sciences toward the hunt for data and theory relevant to each of these levels of effect. A unified scheme offers the hope that although the present state of knowledge may not permit each level of social effect to be penetrated with equal thoroughness, the total search will be comprehensive and with the closure which results

from having considered at least all the kinds of possible effects about which knowledge is desired. Closure is, of course, by definition a product of a unified conceptual scheme. But here, such closure has important pragmatic consequences.

B. A Conceptual Approach to Possible Post-Attack Social Phenomena⁴⁷

(1) Complex Society, and the Nature of the Attack

The interdependence of modern nation-states is often cited as creating difficulties for precisely defining "society." Since contemporary economic and political arrangements frequently cause one country to order its affairs with reference to the affairs of another, is it possible to specify precisely

⁴⁷ This might be viewed, in part, as a use of social theory for speculative and projective purposes, with the resulting scheme being seen as an essay in "speculative sociology." Dr. Burkart Holzner of the University of Pittsburgh has suggested in conversations with the author that the functions of social theory in ordering and projecting processes, whose verifiability status is unclear, within a whole society, for the purposes of generating research, constitutes a specific form of a possible sociological speciality which could be called "radical sociology."

The approach of the present scheme is sociological, but the sociological orientation is meant to set a framework in which other behavioral science perspectives can be employed. Thus, the subject matters and theories of the psychologies, social anthropology, economics, political science, and certain parts of historical studies will be required to define and follow particular research studies. While it is possible to argue that the conceptual orientation taken here is not uniquely sociological, insofar as it is distinctively sociological, it represents for the scholar of social theory an interesting return to an image of sociological theory held by early sociologists. Georg Simmel, for example, was preoccupied with the possible roles of "general sociology" and "philosophical sociology" in helping to provide a basic epistemology for the social sciences. For him as with a number of other early sociologists, sociology seemed to provide the hope of a unique, generally ordering perspective on man's behavior and experience in society and culture. Kurt H. Wolff, (Ed. and Trans.), The Sociology of Georg Simmel, Glencoe, Ill.: The Free Press, 1950, pp. xxvii-xlii. Just as earlier workers saw "the sociological insight" (Continued on next page)

the characteristics of that special combination of complex industrial social order and nation-state that exists today in the Western world?

The problem here is ultimately one of levels and boundaries: society can be seen as existing on several levels, while boundaries of societies do not always coincide with political boundaries. Thus, a nation-state can be both a society in its own right and a member of an emergent society. The growth of emergent supra-national societies can sometimes be stimulated, as is seen in the cases of Western European and Communist-bloc nations attempting to accelerate political and economic interdependence within their own spheres. There may also be assimilated or unassimilated societies within the nation-state, especially when cultures different from the culture predominating in the nation-state provide the foci for these societies. Especially when these societies are unassimi-

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(Continued from page 135)

as ordering previously undifferentiated perceptions of the processes in social structure and culture, so at the present time this insight may offer some useful leverage in considering the vulnerabilities of a whole society faced with urgent, real, persisting threat.

This conceptual approach has been decisively influenced by a body of contemporary functional theory in sociology. Important specific influences have been the approaches taken in Talcott Parsons, The Social System, Glencoe, Ill.: The Free Press, 1951; Talcott Parsons and Neil J. Smelser, Economy and Society: A Study in the Integration of Economic and Social Theory, Glencoe, Ill.: The Free Press, 1956, especially Chapter 1 ("The Problem: Current Sociological Theory and Some Central Concepts of Economics," pp. 1-38) and Chapter 2 ("The Economy as a Social System: Its Internal Structure and External Boundaries," pp. 39-100); and Clifford Geertz, "Working Paper on Symbolism, Ideology, and Social Structure," Cambridge: Department of Social Relations, Harvard University, 1957, spirit duplicated Draft. Since the goal of this approach has been to enable a more coherent organization of the problem of complex society as the target of massive attack, a number of departures and modifications will be noted by the reader familiar with the thinking in the cited literature. To achieve freedom in the discussion that follows, footnotes will be omitted. The discussion should be seen as a non-technical exposition to serve the purposes of this and the following chapters, and the interested reader is invited to consult the cited literature or later literature, such as Talcott Parsons, "An Outline of the Social System," in Talcott Parsons et al., (Eds.), Theories of Society: Foundations of Modern Sociological Theory, New York: The Free Press of Glencoe, Inc., 1961, Volume I, pp. 30-79.

lated ethnic minority societies, these societies can exist across national boundaries and create severe pressures toward realigning the political boundaries of the nation-state. While this problem has existed in the "Balkanized" Europe of the past, it is now an especially important issue in the new nations of Africa, where political boundaries frequently cut directly across societal boundaries. In spite of the emergence of super-societies or the existence of societies which are not coterminous with the nation-state, it still seems meaningful to try to think about societies as encompassing entities of the magnitude of the contemporary United States and Soviet Union. The goal here is to develop a definition or set of descriptive categories of society adequate to the level of the United States and the Soviet Union which will not do violence to other levels and kinds of society.

An influential source of a systematic concept of "society" has been the orientation most characteristic of the cultural anthropologist. He has studied, traditionally, the small, self-contained, self-governing groups who have a "pre-literate"⁴⁸ culture, who subsist from basic agricultural and/or hunting economies, and whose chief contacts with other societies come from simple trading relationships or small wars. The anthropological perspective has been instrumental in orienting the behavioral scientist toward seeing

⁴⁸ One of the crucial features which differentiate small, "primitive" societies from large, complex societies has been the absence of a written culture in the small society. Societies without writing and a written culture are "pre-literate" societies. Written culture, centering on the representation of speech in the form of writing, and the use of words and syntax to stand for things and relationships, seems to be part of the necessary preconditions for the rationalistic, abstract maintenance of economic, political, and legal relationships characteristic of industrial society. Written cultures also provide a more systematic way of keeping history in the society, and thus give the society a baseline of past experience. This seems to enter, ultimately, into development of a sense of "time" in a culture.

societies of whatever kind as being clearly demarcated, whole entities. Each society is perceived to have a distinctive configuration which separates that society from another society. Underlying the distinctive configuration of each society is an orderly pattern of social behavior, social interaction, and social institutions which is generated from the patterned ways-of-doing-things and views of the "good" and the "bad" life which have become enshrined in a corresponding culture. Thus, a society as a social entity is a distinctive entity, made distinctive through processes of social behavior which are generated from a distinctive cultural reservoir, a reservoir which governs and generates only these particular processes of social behavior. While societies in proximity to each other may have similar social institutions and cultures, this is to be taken only as a demonstration that basically similar cultures generate like structural entities and social processes.

With proper qualification, this basic orientation will apply to stating the key general characteristics of a complex industrial society. The members of an industrial society, as do the members of other forms of society, inhabit a core, bounded geographic area which they see as belonging legitimately to them, as they are represented through the continuing culture of their nation. Within this bounded, geographic area, they have, as a people, established two key forms of balanced relationship. One is a static or dynamic equilibrium with their physical environment, from which they draw physical resources for maintaining life or acquiring the wherewithal to maintain life. The second is governed, self-perpetuating social interaction, based on social institutions defined within a culture which they all accept, in at least a minimum sense.

The distinctive features of a complex, industrial form of society are to be found in its particular social institutions and its particular culture. Complex, industrial societies have a high degree of division of labor, among occupational and life roles. This division of labor is further reflected in

institutions for allocating rewards and status to these roles in terms of a general framework. In the culture, systems of currency and abstract legal-financial relationship provide both a common language for rewarding especially occupational role performance and for governing the movements of people from one role to another. In industrial society, social status and power are frequently closely associated with occupational role. This provides an interesting paradox in those societies where a managerial class can achieve enormous influence and power in bureaucracies or in the whole social system, without necessarily receiving correspondingly high remuneration.

The high degree of structural differentiation, the money economy and its capabilities for abstractly stating value, the written culture to which there is relatively open (although sometimes sharply competitive) access, and the existence of social values which emphasize achievement and performance are among the principal features of complex, industrial society which are conducive to strain and conflict in the society. If opportunities for social mobility are relatively large, or if new levels of aspiration seem realistic to individuals or groups which accept the culture of the industrial society, then strain and conflict can arise when movements or aspirations are thwarted. Furthermore, the pressure toward individual autonomy in an industrial society means that individuals or groups with problems -- for example, the ill, deviant, structurally unemployed -- can be neglected, even when those more able to cope with living in industrial society see these groups as "problems." Increasingly, the arena for coping with the strains resulting from these and similar problems is in the already highly evolved political system of the society. But here, ideologies, formed in different ways from approximately the same cultural norms, frequently allow competing approaches to dealing with strain or stating new programs for the people of the society. If the ideological division converts into a debate on

the legitimacy of the existing political order, the society faces a profound crisis of organization. It is noteworthy here that traditions of consensus and the institutionalized Common Law have stabilized the Anglo-Saxon societies, when they were faced with the social structural conditions for political crisis.

By its very complexity and differentiation, an industrial society creates the conditions for internal strain. How well the institutions of the society deal with this strain will ultimately depend on the ways in which each member of the society is enabled to maintain a continuing commitment to the cultural norms of which the visible society is the behavioral expression.

As a social target for massive attack, the United States is, initially, a large collectivity of people arrayed, with varying degrees of concentration and dispersion, across a broad geographical space. The areas of highest concentration are urban, metropolitan areas; in addition, these areas form the centers of command-control and communication nets extending into the less densely populated areas. The United States is also, as a social target for attack, an array of artifacts which provide the records, facilities, objects-of-exchange and objects-of-possession of social existence.⁴⁹

The definition of the "massive attack" which intrudes into these arrays will remain, beyond a certain point in this essay, purposefully vague. The goal of this essay is to develop a conceptual approach which will point to the key features of American society which need to be considered for a variety of massive blows, using one of several alternative attack strategies which

⁴⁹ The term "artifact" is used here primarily in the sense in which it occurs in archeology and cultural and physical anthropology. Its most general meaning here is "physical residue or product of social process or social existence"; for industrial society, artifact can range from minute objects, such as pins and coins, to elaborate bureaucratic control systems, such as teletype systems.

might be available to an opponent. The emphasis is not on working out the effects of a specific attack. This means that the scheme should be relevant whether the aggressor strikes: (a) against all the major metropolitan and industrial centers of the United States, in a massive "counter-value" attack; (b) against only American strategic force capabilities, in a massive "counter-force" attack; or (c) against some combination of targets resulting from a mixture, either deliberate or accidental, of the two preceding basic strategies.⁵⁰ But as a tentative limit to the size of the massive attack around which this conceptual approach was attempted, it can be said that it was felt that present research studies on possible social phenomena following a massive attack should be designed with reference to a hypothetical attack of from 1,000 to 10,000 megatons, distributed over the majority of the major metropolitan areas of the United States in units proportional to the size and importance of each metropolitan area hit. A more specific attack targeting was not employed. It should be emphasized once more that the purpose of this analysis is to consider the general nature of the concepts necessary to think about the social effects of massive stress striking American society. Thus, it was important to avoid making the analysis depend on a particular set of attack characteristics, other than the general characteristics that are described here.

The attack considered here is an attack made with thermonuclear weapons systems. It is assumed to come in one mighty blow, or in a series of closely related blows over the short term. Possible mixes of weapons systems, such as thermonuclear weapons coupled, in required time phasings,

⁵⁰ For a discussion of possible alternative attack strategies, see Kahn, op. cit., and Fryklund, op. cit. Also see Herman Kahn, Thinking About the Unthinkable, New York: Horizon Press, 1962, pp. 60-69. Those who believe that possible strikes against American society will be essentially of the "counter-force" variety recognize that the current deployment of strategic missiles may automatically bring certain metropolitan areas into jeopardy.

to chemical or biological agents, are not considered. Possible additional aggressor strategies, such as invasion of the society, are not considered. It has not been assumed that an effective system of sheltering the population from weapons effects has been established, although it will be seen later in this section that it is useful to label the immediate post-attack time phase with reference to whether or not shelters exist. The focus is exclusively upon a massive thermonuclear strike against a highly vulnerable complex society, and to the kinds of analytic problems that such a strike presents. It has seemed fair to think that if these problems could be stated, then additional complications could be introduced at a later time.

Given this general orientation to America as a form of complex society, and to a particular kind of massive attack which could be made against it, it is now possible to be more precise about the levels at which social effects may occur.

(2) Systems of Society as Levels of Behavioral Effect

(a) Systems, and the hierarchical specification of action

The importance of considering behavior

The effects of massive attack which the behavioral scientist must consider begin in acts of individual or group behavior, or changes in the conditions (including the facilities) which influence this behavior or toward which this behavior is directed. That these are taken as the initial data for analysis does not mean, however, that this approach is the behaviorism of the extremely operationally oriented experimental psychologist. This analysis must treat the behavioral data resulting from group life, ideologies, and cultures, as well as the unit-item behavioral outputs of individuals engaging in discrete acts. But regardless of the ultimate level of reference, the data on effects begin in behavior, or in the constraints, conditions, and facilities of behavior.

The problem of levels of determinants; the concept of "system"

It is at precisely this point that the central analytical problem begins, in the majority of the behavioral sciences. If acts of behavior or the conditions of behavior form the initial data, how then is it meaningful to speak of "the group," "the social system," and "the culture" as determinants of behavior? Since the early emergence of political theory in the Greek city-state, there has been a running debate in Western Civilization on the relation of the individual to the supra-individual. The debate turned, in the time of the Greek city-state, on the proper relation of the individual to the polity; in the contemporary behavioral sciences, the issue is how to be specific about the scientist's perception that structures and processes on a level of generality higher than the individual shape individual behavior. It is urgent to deal with this issue systematically when considering massive attack against complex society, for it is evident that without the ultimate restoration of a variegated structure of supra-individual institutional arrangements, the existence of complex society is threatened.

To deal with this central problem of levels of determinants, it is useful to introduce an analytic device which abstracts a recurring phenomenon in human behavior and social interaction. This analytic construct is the notion of "system"; the phenomenon which forms its referent is the interdependence of events of human behavior, social interaction, and cultural experience. Behavioral events do not seem to occur as isolated happenings, at random. They occur in interdependence with environment, both physical or social. An initial task in the behavioral science of individual behavior is to find out how changes in physical and social environment alter behavior. From the study of these alterations comes several key insights about regularities and predictabilities in human acts: that regularities in the process of the environment impinging upon the individual are associated with a structure of responses and acts in the individual; that individual behavior, when directed not just by the need to respond to

environment but by apparently autonomous mechanisms of motivation and memory, exhibits regularities and organization which are discernible by the analyst.

It seems that these kinds of regularities are associated with other discernible regularities. There are, for example, recurrent patterns of individual behavioral organization, such that individuals can be classified according to types of patterns. Some of these regularities seem to be associated with the whole society's culture, that distinctive body of integrated symbolic systems and styles for defining the values, meanings, and techniques of address to be taken toward the real world which provide the modes through which people relate to each other in society and to the world of that society. On this level, the awareness of differences in types of organization of individual behavior often begins in the perception by the observer that personality characteristics of individuals seem to differ from culture to culture.

Other kinds of regularities in individual behavior seem to be related to recurring arrangements of types of behavioral organization within a given culture. These types do not usually involve the whole personality of the individual. Instead, they derive especially from particular kinds of participations by individuals in social interaction. In interactive relationships with others, individuals frequently engage in stable patterns of behavior, which are reinforced by their perceptions of expected behavior in others, and of others' perceptions and expectations of their own behavior. These stable patterns point to the existence of collectivities of people, in which individuals exhibit and expect stable patterns of behavior. These collectivities are frequently organized explicitly around a number of types of behavior and expected behavior. Sometimes these types are to be seen in families, where different ages and functional activities define different types of behavior and performance. Sometimes stable patterns of behavior

and expectation occur in small, informal, "primary groups" of individuals -- especially in these groups, the individual may learn what kinds of expectations and performances are desirable to others. Other patterns of behavior may center around a functional, occupational activity for which the individual is given his principal rewards and status. In industrial society, these occupational patterns are frequently part of larger, coordinated organizations of occupational function which form the social systems of large bureaucracies.

These differing types of behavior and performance according to expectation are all examples of social role. An individual engages in a social role when he systematically engages in patterns of behavior and expectation with reference to another individual, and when the other acknowledges the existence of this stable pattern. Complex organizations derive from the coordinated activities of many different kinds of roles: in such organizations, for example, there are formally defined roles to fulfill managerial as well as production functions. In the small informal group or in the family, however, it can be said, with equal validity, that roles exist. Being a friend of another can, merely in itself, be a role, involving legitimately expected patterns of reciprocal behavior. Families have roles, centering around the performance of necessary reproductive, provisioning, and educational functions. It is from the organized structures of roles -- which may exist for any one individual in great numbers and with many simultaneously differing references -- that secondary levels of social organization build up beyond individual, face-to-face interaction. These secondary levels can be seen, most generally, as the patterns of organized activities within varying kinds of collectivities of individuals. They may include such diverse forms of collectivity as a large friendship reference group, a bureaucratic organization engaged in producing characteristic products for the society (this includes organizations of many differing types, such as churches, businesses, and the

military), the professions, which explicitly develop and legitimize new members, and mobs or crowds, where the roles perceived to be available to participants may be simply those of "leader" or "follower." The pyramiding and overlapping of secondary levels of behavioral organization beyond immediate face-to-face interaction, but depending both initially and ultimately upon this interaction, are the key processes in forming social systems and structures from individual actors.

Links and relations among levels of behavioral organization

A striking fact in all these regularities of types and differences in behavioral organization is that at whatever the level of reference, systems exist. In the levels of secondary organization beyond individual face-to-face interaction, systems of behavior exist which form a distinctive level of human organization. Beyond this level, the culture in which all the secondary organizations and the whole population of a society exists exhibits systematic organization, with pressures toward coherence and closure. Systems of social value, for example, contain symbolic means for their interpretation, while cognitive styles toward the world tend to preserve their coherence in the face of new experience, by having mechanisms or reasons which "explain" the new experience. Here it becomes possible to begin to speak of linkages among levels of organization. Within a given culture faced with new experiences impinging upon its members, specialized social roles and secondary levels of social organization may exist, which fulfill the function of using the mechanisms within the body of culture for interpreting the culture. For different eras in history, such specialized social organizational functions may inhere in the roles of priest, magician, scientist, and politician. Thus, within a society, linkages now may be said to exist between the system of usages which form the culture, and the system of social roles which form secondary levels of social organization.

As the individual exhibits stable patterns of behavior, his continuity and identity present their own systematic characteristics, independently of

any particular immediate participation in social roles. This continuity and identity are often denoted the "personality" of the individual, and are seen to evolve over the years the individual lives in his social and physical environment. In examining various possible levels of behavioral organization, the ultimate reference is to individual acts of behavior, centering around this individual personality. In exhibiting the characteristics of a self-maintaining system in continual process, the personality exhibits a level of system-organization independently of the levels of organization within the secondary organizations in which it participates, or of the culture, which provides the value-symbolic-cognitive framework within which both individual behavior and secondary social organizational process take place. Yet it is an additional striking fact, as well as a subject for further investigation, that levels of behavioral organization, on the level of the individual, social organization, and culture seem reciprocally to influence each other, be determined by each other, or co-vary. This reciprocal influencing among levels of behavioral organization forms a total series of social processes, which mediate the behavior processes of all members of a society. Within each behavioral level, it is possible to point to functional processes which maintain the coherence of the system at that level. For the individual, seen as a personality system, patterns of behavioral adaptation coexist with personality processes which maintain identity. These processes center around complex processes of learning, motivation, and memory. On the level of social organization, roles and functions maintain particular structures within collectivities, while complementing roles and functions, sometimes of great complexity, mediate change within the limits in which it is possible to adapt to change.

The hierarchical specification of social action

The existence of levels of behavioral organization, from the individual level to levels beyond the individual which are as real and as visible, can be thought of as levels of the hierarchical specification of individual action. A

number of levels beyond the individual level seem to determine individual acts and patterns of behavior. These levels can be seen as systems, which are linked to each other, and which tend to maintain themselves over time, even though they may be in dynamic and not static equilibrium with whatever constitutes their particular "environments." Within each system, in turn, it is possible to discriminate analytically levels of increasing concreteness, or internal specification of action. Thus, within the system of potential behavioral organization formed by a cultural system of values, the value system of the culture exists on a higher and more general level than the particular ways in which these values exist as programs, ideologies, and procedures for manipulating the world. The concept of "value system" is more general, in that a value system constitutes the basic approach toward the real and the desirable which is legitimate within a culture. To become operative in action, however, a value system must be spelled out in prescriptions and approaches to the real situations in which subscribers to that value system find themselves. This is especially true when these situations do not require simply the symbolic affirmation of belief in the value system, but sustained patterns of role behavior over time. Here, when the value system is translated into "technology" and "ideology," the more precisely specified cultural system sets the immediate conditions of role behavior, and the hierarchy of action specification in the cultural system translates into the hierarchy of action specification in the social system. Over time, patterns of role performance in the social system may influence the content of levels of the cultural system, and modify them, creating new possibilities for action specification within the cultural system. Similar patterns of action specification could be suggested for other major levels of behavioral system in society. In the end, "behavioral system" means a sub-system of the society which has the capa-

bility for organizing or immediately directing individual behavior, through processes of both internal specification and dependence on other behavioral systems.

In this essay, a system is, most generally, a set of elements and processes such that changes in one element or process will result in changes or adaptations in other elements or processes. In this idea of system is the further idea that within the system, there is a functional differentiation of elements and processes, according to whether, in any given situation of the system, an element or process meets one or another of the conditions for the continued maintenance of the system. It is convenient to think of these functions as dividing into maintenance functions and adaptive functions, although it should be clear that a number of interesting analytic problems are foreshortened in stopping at this point. For example, there would seem to be differing kinds of both maintenance and adaptive functions. Furthermore, within a particular maintenance process, there may be adaptive sub-functions which have the effect of enabling the maintenance process to continue, and vice versa, for the case of a particular adaptive process.

The present purpose is, however, to suggest how a style of thinking about society can be applied to the particular problem of describing complex society under massive attack. For this reason, some further problems in the concepts of "system," "function," "hierarchy," "equilibrium," and "environment of system" will be neglected here. Moving on in dissecting the problem of what may be involved in thinking about the effects of massive attack, it is of immediate importance to determine the kinds of impacts that massive attack might have on the behavioral sub-systems of society, the ways in which attack effects might be expressed when one system is compared to another system, and the ways in which the "level of behavioral

system" concept is useful in forming some estimate of the requirements for societal responses to massive attack. To do this, it is useful to specify more precisely the behavioral systems which can be considered to be the target of massive attack, and their interrelations.

(b) Behavior patterning systems, and societal maintenance functional primacy following massive attack

A society is composed of people and the patterns which form them into self-maintaining relations of interdependency. These patterns are not expressed merely in a culture and set of social institutions, however; they are expressed in the physical world by a fundamental equilibrium process which the society maintains with its physical environment. Without this process of continuously forming a population with reference to an environment, there is no reproduction of individuals, and no formation of individual personalities through social interaction and the learning of the cultural system. It is possible to consider the process of continuously forming a population, in relation to environmental constraints and potentialities, as producing characteristics of population reproduction which are defining of the population and not, in the first instance, of the individuals within it. These characteristics are characteristics of the ecological sub-system of society, or the ecological system level of behavioral specification.

The ecological system is the system composed of a population of individuals in equilibrium with the environmental conditions necessary for its support. The ecological system does not specify the particular variations among individuals in its population; rather, it sets the ranges within which variations can occur, and the basic characteristics of the population. It is therefore a behavior patterning system: the ecological system establishes the basic patterns of behavior for the whole society by determining the broad characteristics of the individuals who will exist in the society,

through determining the rates and ways in which individuals will be generated from basic racial stocks.

Just as individual organisms are generated from an ecological subsystem of society, so ranges of possible behavior, both desired and non-desired, are generated from a set of basic value and symbol systems which exist in the culture. The culture, through its levels of specification, determines the meanings and approaches toward the world to be taken by the individuals who live through social interaction. Here again, a behavior patterning system exists for the society. The cultural system does not directly determine specific units or acts of behavior, nor is it, directly, "behavior." Behavior exists only in individuals which, for present purposes, must live in social interaction. Thus it is the interactive situation of individuals which generates behavior. But the cultural system specifies the kinds of behavioral alternatives which are desirable and non-desirable in the culture, and in doing so, patterns ranges of behavior.

Both the ecological and the cultural systems of society affect acts of behavior by translating into systems which actually govern behavioral outputs. As systems in their right, however, these two systems represent the ultimate reservoirs of potentialities for behavior, and the systems from which new behavioral possibilities will be generated in the society. Thus, before a self-generating society can exist after massive attack, there must be the sustained reproduction of new individuals in the ecological system. Equally crucial, to be the same society that existed before the attack (and this is both a definitional as well as a moral, policy issue), the values of the cultural system must continue. During and after massive attack, then, the pre-attack society will ultimately exist only if its basic potentialities for behavior continue. The ecological and cultural systems are the centers of the basic pressures for the continuation of these patterns, and during

post-attack social reconstitution, it can be projected that they perform the societal function of maintaining society's basic defining characteristics, as well as constituting the basic constraints for the formation of new characteristics. If society is considered to be a system having the fundamental functional requirements of maintenance and adaptation in the post-attack world, then the ecological and cultural behavioral system levels of society have, as their primary functions in the whole society, the maintenance of the society's basic characteristics during massive stress.

(c) Behavior-social action systems, and adaptation as their primary functional process in society following massive attack

Individuals act, and in society they act through processes of social interaction. It has already been suggested how individuals can be seen as behavioral systems; these behavioral systems are personalities. Similarly, the structure of social interaction, from immediate interactive contexts among individuals to complex secondary levels of social organization, form a social system, composed of a number of levels of social system.

Personalities become operative as a result of a translation of the general life history of the individual, whose potentialities were determined by both the ecological system and the cultural system, into a personality existing in the present time and prepared to act in a perceived world that is salient to and defining of action possibilities. Within the social system, the cultural system of value and action prescriptions exists as a set of social values which immediately specify the limits of the institutional structure of the social system. Within the social system, an institution is a specific, legitimate pattern of behavior and interaction which orders individual behavior, especially in the direction of meeting functional requirements in the social system. An important distinction must be made here: an institution is not a social organization, but a pattern of recognized action within which social

organizational activity may exist. Thus, the monetary system is an institutional structure, ordering a wide range of behavior and expectations, within which the social organizations of business and production exist. Marriage is an institutional arrangement which is implemented, at the level of social organization, in particular organized collectivities charged with conducting and supervising marriage ceremonies and sacraments.

For the analyst of society, the first level of visible behavior occurs as individuals interact in organized collectivities through role relations or role equivalents. It is this behavior which he must trace back through its determinants. In the process of tracing this behavior, the behavior can be interpreted as it illuminates the personality system of the individual himself, or the social, cultural, and ecological systems. In the post-attack situation, both the individual, personality system and the social system will, of course, engage in crucial, internal-to-system maintenance functions. But taking society and its responses to massive attack as the level of reference, the individual system and the social system become the centers of the actual behavior to adapt society to stress. At this level, adaptive behavior is programmed and carried out. The individual and social systems form a level of behavioral-social action systems, and this level of behavioral specification system has, as its prime post-attack functional process in society, adaptation. Within the framework established by the possibilities inherent in the ecological system and the cultural system, adaptive social action occurs, and is seen first, on the level of the social action systems. Over time, action taken at this level may affect the behavior patterning systems of society, thus changing anew the conditions of social action by a circular process.

(d) The systems as functional, and the systems as targets

Two basic levels of system of behavioral specification emerge: "behavior patterning" and "behavioral-social action" systems. It has been projected that in post-attack society, the behavior patterning systems will have, as prime functions, maintenance, while the behavior-social action system level will have, as prime societal function, adaptation. In this abstract analysis, it must not be forgotten that it is ultimately behavior and the artifacts of behavior that are the targets of attack. Yet the position was taken in Section I as well as in this Section that behavior provides the evidence for effects on all levels of society and human organization. How are such systems as the cultural system targets for massive attack? How is "society," as a group of coordinated levels, a target for massive attack?

If the four systems which have been described here--the ecological, individual, social, and cultural--are considered in the light of these questions, an illuminating set of contrasts among them emerges. These contrasts can be summarized in the brief proposition that while there are behavior patterning and behavior-social action functional levels of behavioral specification, within each of the two functional levels is a pair of potential target systems, one member of which differs from the other in its general nature as a target.

It has been seen that the actual behaving organisms of society are generated from the ecological system; from this behavioral patterning system come individuals who form a different system level, that of behavior-social action. But just as individual systems emit behavior and social acts which are eliminated and/or modified as attack effects, so does the massive attack strike at the population and its physical environment as a totality, through these individuals and their environments. Thus, although the ecological system and the individual system have different functional relevance to post-attack society, they are both organic entity targets. "Organic entity" here means the unified, physical objects which behave (on the individual level) or which provide the conditions of behavior (on the ecological level).

Behavior of organic entities, or behavior directed with reference to organic entities, is also a direct target or a direct result of massive attack. The resulting behavioral changes produce immediate or later direct changes in social structure and behavior -- in the social system. As a result of behavioral changes in the social system, the cultural system (note, the analysis goes back to the behavioral patterning level) becomes a direct target of massive attack. The removal of the possibility of behavior with reference to the culture, by destroying the artifacts of the culture which exist in systems of social interaction, by hindering the available store of relevant opportunities for behavior, or by removing behaving organisms, means that the existing body of culture must either change, or that the behavioral conditions for behaving with reference to the culture must be restored. Since the culture will be present, in some sense, in the experience of survivors of massive attack, great pressures will exist to behave with reference to it, simultaneously with losses in the operational potentialities of the cultural system. Here, behavioral effects in the behavior-social action level become behavioral effects on a different level of behavioral specification and functional meaning, just as the losses of organic entities on the individual system level are organic entity effects on the whole population, in the ecological system of behavioral specification.

Although the ecological and the cultural systems are both behavior patterning systems, the ecological system provides "organic entity" targets for massive attack, while the cultural system provides "behavioral entity" targets. Similarly, although the individual and the social systems are behavior-social action systems, the individual system provides "organic entity" targets, while the social system provides "behavioral entity" targets. Thus, in this conceptual approach to levels of society, the behavioral patterning level is target both as a set of discrete entities and as a unified behavioral process which is reflected in acts of these entities, and whose

existence is, in fact, inferred from these acts. This same set of relationships holds on the behavior-social action system level, as this level is a set of targets in the cases of the individual and the social systems. Ultimately, however, the cultural system becomes a target only as organic entities and artifacts first become behavioral targets, in the social system.

Therefore, two kinds of analytic discrimination cross-cut. The basic, analytic-constructive separation of the four systems into two functional levels of behavioral specification is cross-cut by the separation of the kinds of components of all behavioral systems into organic entities and behavioral entities. Within each of the two functional levels are behaving, organic entities, whose behavior forms the data for the constructs about parallel socio-cultural dimensions of the entities' existence. Thus, analytic constructs of one kind are cross-cut by analytic constructs of another kind.

Figure III-2, p.157, schematizes the relations among the four behavioral systems and two levels of functional relevance of behavioral systems in post-attack society. As functional level, the "ecological system" generates "individual systems," which are organic entity targets on both behavior-social action and behavior patterning levels. As behavioral entity targets, outputs of social behavior from organic entities are changed when behavior of organic entities changes, and these changes are reflected in the cultural system as a behavioral system. At this point, the cultural system acts as an ultimate reference point for behavior change, establishing by its reference to continuing value-symbol systems standards for new action in the post-attack world.

It will be seen that in this analysis, the individual is both an organic entity subject of attack effects, through his physical entity, and a behavioral entity subject of attack effects, through his acts and the context of social roles which organize his acts. Thus it is the individual which forms the link between the organic entity targets and the behavioral entity targets of the massive attack. Moving to the behavioral patterning level of reference among the organic entity targets, possible effects on the physical environment

and population of the ecological system result from attacks on large numbers of individuals and their sustaining conditions. Moving to the behavioral patterning level of reference among the behavioral entity targets, modifications of individuals' behavior make the cultural system a target of attack, as it is a system dependent on behavior or the artifacts of behavior.

Figure III - 2

**CATEGORIES OF BEHAVIORAL SYSTEMS,(a) AS THESE SYSTEMS HAVE FUNCTIONAL PRIMACY IN SOCIETY, WITH REFERENCE TO ATTACK RESPONSE; (b) AS THESE SYSTEMS FORM TARGETS FOR ATTACK:
Shifts in Meanings of Systems**

**(a) Primary Functions, With Special Reference to Responding to Attack:
Maintenance versus Adaptation**

BEHAVIOR PATTERNING SYSTEMS: Maintenance	BEHAVIORAL-SOCIAL ACTION SYSTEMS: Adaptation
ECOLOGICAL System CULTURAL System	SOCIAL System INDIVIDUAL System

(b) Principal Characteristic of System as Physical Target of Attack

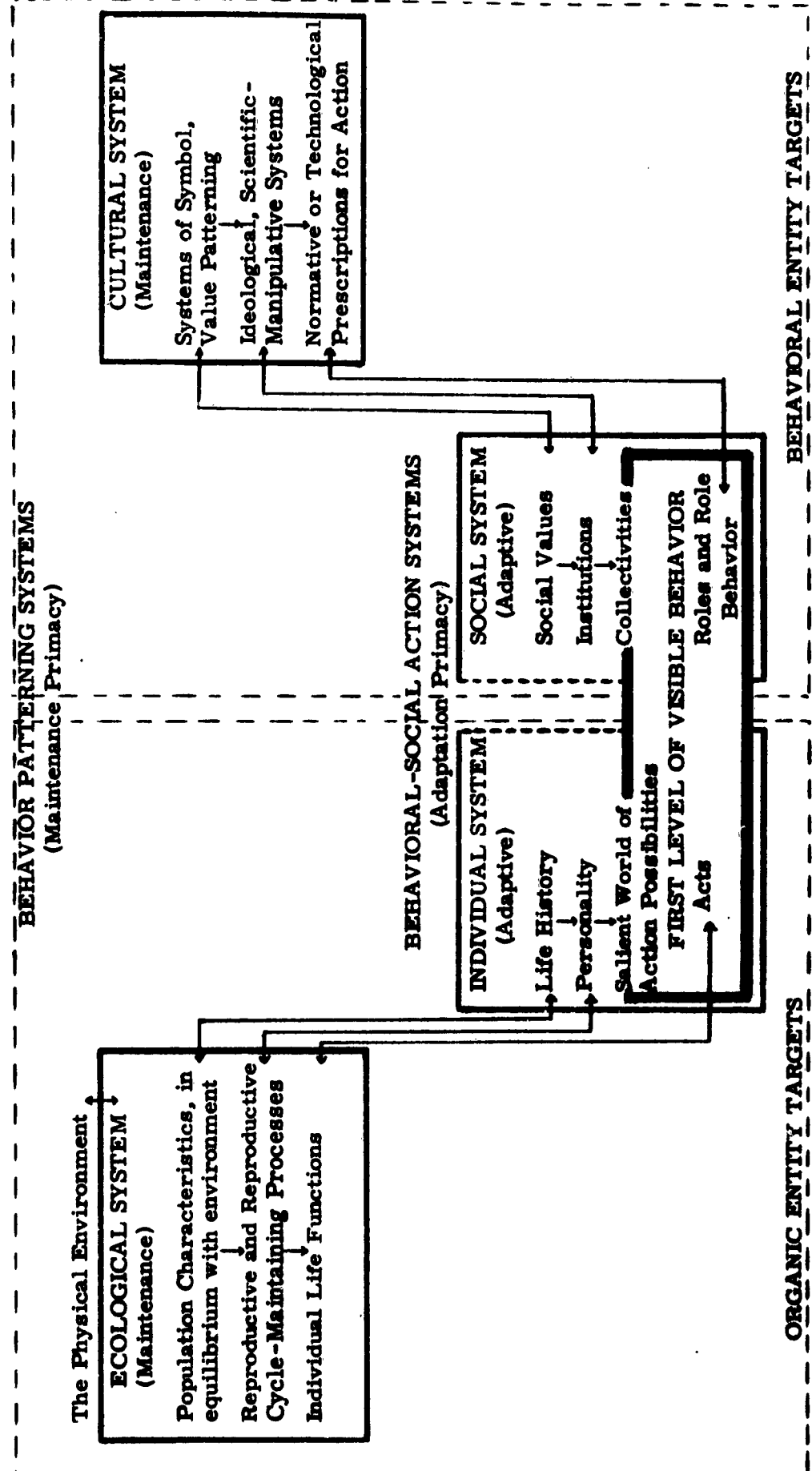
ORGANIC ENTITY TARGETS	BEHAVIORAL ENTITY TARGETS
ECOLOGICAL System INDIVIDUAL System	CULTURAL System SOCIAL System

(e) The society as the summation and reciprocal interaction of levels

Figure III-3, p. 159, diagrams the various relations of the four functional-behavioral systems of society, as they are targets and as they form hierarchies of action and behavior specification within each system and among systems. It will be noted that within each of the four systems, downward-pointing arrows indicate successive levels of concreteness (or decreasing levels of analytic generality) in the specification of the conditions for acts, as that system functions to determine acts. It will also be noted that there are two-headed arrows between the ecological and the individual systems, and between the cultural and the social systems, and that there is special prominence given to the two-directioned relationship in the "First Level of Visible Behavior," which joins one broad hierarchy of action specification (the ecological-individual) with the other (the cultural-social). These two-directioned relationships point to internal-to-system hierarchical levels which are at the same level of analytic generality across systems, but these relationships are not those of direct causal connection. Given two behavioral systems, processes of influence on the same level of analytic generality run, as behavioral processes, down to the lowest level of analytic generality in the first system, where they translate into behavioral processes or process-equivalents in the related system, whereupon the pattern of influence is upward in the hierarchy of action specification, to the requisite level. Taking an example, consider the effects changes in the personality of an individual have upon reproductive and reproductive cycle-maintaining processes in the ecological system. Change in personality is reflected in acts, still within the individual system. If, at the level of roles and behavior, this change in one personality reflects a large-scale process of change in the social system and culture, individual life functions in the ecological system now change through the summation of behavioral changes in individuals. This, in turn, is reflected in changes at the next level of analytic generality in the

Figure III- 3

HIERARCHIES OF ACTION SPECIFICATION FOR EACH MAJOR BEHAVIORAL SYSTEM OF SOCIETY



ecological system, the reproductive cyclical processes, which in turn affect basic population characteristics and potentialities. Thus, Figure III-3 presents a visual way of tracing through effects of changes in one system to changes in another system, but in all cases, the changes must, as empirical processes, flow down to and through the "First Level of Visible Behavior," where they are either facilitated or constrained as empirical processes of action. These processes are constrained if the analyst is examining an individual who is idiosyncratic; if a deviant case is being examined, behavior will not result in changes in the systems of behavioral specification but, rather, will be constrained by agencies of social control at the behavioral-social action level.

The meaning for this analysis of the "First Level of Visible Behavior" should be reemphasized. The inference that an act or social behavior reveals systems of behavior on a level higher than the individual depends on properly interpreting the "First Level," and properly crossing the boundary between visible behavior and entities whose existence can only be constructed from this visible behavior. When the analysis goes from the level of acts to that of "personality," the boundary between empirical data and construct occurs as the analyst considers the actor's reports of what constitutes his "salient world of action possibilities." This can be seen, in one sense, as the "leading edge" of the actor's personality, a perceptual system relatively accessible to the analyst, and but one step removed from acts. When the analyst goes from observation of coherent role behavior to imputing the existence of institutions in the social system, his analysis passes through the boundary between direct observation and construction, as the analyst sees organizations and stable role patterns emerge among collectivities of individuals.

This entire conceptual approach is basically a way of seeing the reciprocal interrelations of levels of societal sub-system process. It is thus better suited to tracing the effects of changes, than to explaining the causes of changes. But note here that what has been sometimes viewed as a defect of this kind of functional thinking about society is, here, an asset,

since a conceptual scheme now exists for the purpose of tracing through changes which can be supplied by the analyst --- changes projected as following the particular effects of a massive attack. Further theoretical study of this scheme may suggest how social change occurs within the society as a combination of events within or among the four behavioral systems. For present purposes, however, the analysis of this problem can be temporarily halted, since the conditions of change have been supplied, in the form of massive attack.

(f) Phases in time following massive attack, and a research generating matrix

The very emphasis of this conceptual approach on the description and tracing through of the general interrelations of levels of behavior, the interrelations of attack effects, and the interrelations of critical societal functions, among the four behavioral levels, means that the four behavioral levels are seen as determining behavior over time, after attack. While the conceptual approach derives from the conceptual analysis of pre-attack society, it begins to describe behavioral process and societal function after a massive attack and its effects are introduced into the system postulated by the approach. The conceptual approach exists to organize thinking about the behavioral effects and social phenomena in society after attack, and since effects and phenomena are expressed in some time dimension, the question is not whether the conceptual approach can be kept atemporal and "cross-sectional" in time, but, rather, what is the most relevant time dimension to introduce. Here, the present inadequacies of social theory may limit the analyst in his ability to be sure that he has focused on the best way of breaking the time dimension after social change begins as a result of massive attack. Nevertheless, there seem to be several considerations which suggest the basic way the society described by the conceptual scheme can be seen to exist over time after massive attack.

The necessary introduction of a time dimension into this conceptual approach marks the beginning of a number of general kinds of hypotheses and problems in the analysis of possible post-attack social states. These problems begin with a consideration of the full meaning of "social effects" of massive attack. More than producing a series of unit effects on individual, behavioral entities, massive attack seems to have the capacity for extensively disrupting the behavioral entities and patterns which characterize complex society. In the most general sense, a massive attack may be so disruptive of complex society precisely because it intervenes in the patterns of interdependence represented by the four complementary levels of society. This disruption can be seen as beginning in the sharp modification of the behavior of individuals during and immediately following attack, or the elimination of wide ranges of behavioral possibility. Such changes can immediately begin to affect the interactive structure which is the core of complex society.

It is necessary to assume that for some time after the immediate impact of the attack, the ranges of behavioral possibility in complex society will continue to be sharply modified. This necessary assumption results from the interaction of the immediate effects of the weapons used in the massive attack. First, blast damage and the rates of attenuation of residual radiation destroy capacities for behavior or sharply limit the possibilities for engaging in behavior in the short run. Secondly, adaptive behavior which will enable subsistence of individuals in this altered world must be generated. The extent to which such adaptive behavior will set constraints for later behavior is a matter for further investigation, but it seems probable that some of the first pressures against the restoration of the pre-attack social structure and toward the formation of a somewhat modified social structure will be generated from the kinds of adaptive requirements which will exist in the short run following massive attack.

The probable modifications of behavioral possibilities and probable pressures on social structure point to the fundamental question in looking at behavioral processes in time, following massive attack. Behavior and social interaction will be guided not merely by the possibilities for action which will exist, but by whatever images and particulars of the ultimate recovery goals of society are governing. The degradation of complex social organization which is possible following massive attack implies, in the framework set by the severe limitations on behavior which will exist in the short run following massive attack, that to restore complex social interdependence, there must be a passage through intermediate stages of restoration. This seems especially so in industrial society such as the contemporary United States, where institutional and organizational pluralism exists and is highly valued.

In an earlier portion of this section, there was discussion of the ways in which the goals of the civil defense planner interact with those of the behavioral scientist to create guidelines for assessing criticality and strategicity of research. Here the importance of recovery goals reappears, as providing a concrete sense of the time frame in which social process must move. But if recovery goals are unclear at the present instant, how can a time frame be developed which will accommodate a number of recovery goals, while pointing to the continuities in social process which are characteristic of all conceivable post-attack social recovery processes?

It seems here that the necessary time dimension must be constructed in terms of the constraints which will exist upon any behavior following massive attack, but permit the conceiving of post-attack social processes as moving toward recovery states. For any recovery goal, recovery requires the reconstitution of viable behavioral systems along a time-frame of phases defined by pre-determined estimates of the feasible and desirable points for broadening and accelerating recovery. These estimates depend upon some prior notion of what are the desirable kinds of direction and control to be exerted

in recovery, as well as what kinds of recovery measures will be feasible at various points after massive attack. For present purposes, however, it is necessary only to see that in restoring the interdependence of behavioral systems characteristic of complex society, recovery phases will be successive and linked, and that they will follow, furthermore, from immediate post-attack behavioral constraints which are not influenced by recovery goals. Thus, it does not seem necessary to conceive of particular definitions of recovery in order to take analytic account of the structural imperative of recovery processes in complex society -- that these processes adequately allow for passage in time through levels of increasing complexity, ambiguity, and behavioral freedom. This imperative is the social structural equivalent of the limitations on behavior which immediately follow massive attack and which form the initial set of constraints on social life in individuals.

An approach toward combining these levels of constraint is that of Nordlie and Popper, who discriminate several post-attack phases for thermonuclear weapons attacks, principally on the basis of time after attack and the living conditions which are imputed to be associated with major points in time after attack.⁵¹ Beginning with the impact of the weapons, they outline four phases in the post-attack situation: Impact Phase, Closed-up Phase, Emergence Phase, Reconstitution Phase. These phases center around the assumption that the population will, in the vast majority, orient themselves to recovery procedures on the basis of constraints imposed by the existence of shelters. A similar progression is offered by Carl F. Miller of the U. S. Office of Civil Defense, in a recent paper on some of the administrative guidelines for civil defense research program content.⁵² He distinguishes phases

⁵¹ Nordlie and Popper, op. cit., pp. 3-5.

⁵² Carl F. Miller, "Outline of Research Program Content," Washington, D. C.: U. S. Department of Defense, Office of Civil Defense, 1 December 1962, (offset), pp. 4-7.

for the time period beginning before massive attack and running to final recovery of the society; these phases are the Preparatory Phase (beginning in the present, when civil defense organizations and other preparatory measures are instituted), the Critical Tension Phase, the Attack and Shelter Phase, the Initial Recovery Phase, the Reconstruction Phase, and the Final Recovery Phase.⁵³

By combining the time-frames suggested by Nordlie and Popper and by Miller with the analysis of the four systems of behavior and behavioral effects of attack which has been proposed here, it is possible to begin to see how each of the four systems and their interrelations can be projected into time. By using the four systems of behavioral effects and their functions as levels of a behavioral dimension, and appropriate time phases for each behavioral level as the time dimension, it is possible to construct a matrix which will allow the analyst to describe more precisely kinds of post-attack social process, for the whole society and for each functional level, especially social processes about which pre-attack assessments seem to be important.

⁵³ Miller also discriminates five major social activities in moving toward recovery in post-attack society:

- "1. Communication: To exchange information among people (in the countermeasure system it is to accumulate and disseminate information--warning, damage assessment, monitoring, instructions, plans, general news, etc.).
2. Control: To implement decisions (in the countermeasure system it is to maintain continuity of authority and power--assure organized action).
3. Maintenance and Repair: To fulfill basic, physical needs (in the countermeasure system it is to provide necessities of life).
4. Transportation: To move people and resources (in the countermeasure system it is to circulate people and materials to locations of need).
5. Production: To acquire and process resources (in the countermeasure system it is to fabricate required survival and recovery goods and products)."

Ibid., p. 8. These social activities are included, in various ways, in the specific studies of the following chapter, and in the conceptual approach taken in this section of the present chapter. In Miller's paper, these activities are arrayed for each post-attack time phase. See also Nordlie and Popper, op.cit., p. 38 ff.

By examining each behavioral level across a set of time phases common to the other behavioral levels, it becomes possible to see more clearly, and in relation to each other, the kinds of studies which are critical and strategic for understanding the central functional problems of the society after attack.

The time phases used in the matrix which concludes this chapter begin with the impact of the massive attack. Immediately before or during the impact of the attack, the majority of individuals who will survive must either be shielded in some way or be far enough away from the impact points to reduce exposure to weapons effects below the danger point. Individuals in blast and/or fallout shelters will, of course, be immobilized and constricted in their range of behavioral alternatives for some time. It seems likely that individuals who survive but who are not shielded will, for some time, be confused, passive, or stunned, and that the behavior of many will therefore await organization. The time phase during which individuals are sheltered and/or awaiting organization of their behavior is denoted the "Shock and Shield Phase," or, for convenience, the "Shelter Phase." During this phase, the immediate constrictions put on behavior by weapons effects are at their maximum.

As the time after attack lengthens, the Shelter Phase leads to a period of "first emergence," when survivors must define what is left from the attack, the immediate steps required to begin coping with attack effects when they resume coherent activity outside their immediate zone of the world, and the preconditions for acting with reference to recovery goals. Some of these preconditions will carry over from or possibly have been established in the pre-attack period, and become active in the post-attack situation. The persistence of the physical threat of the weapons effects, under many potential attack strategies, can significantly limit the extent to which continuous effort outside shelter or shielding can be undertaken. From time to time during the First Emergence Phase, therefore, individuals must withdraw from a still contaminated environment, and it is impossible to maintain sustained activity in this environment.

The First Emergence Phase , which may vary in length for different locations in the society or country, becomes the Initial Recovery Phase , when the necessary minima for the beginning of a later, sustained recovery effort are established. The First Emergence Phase and the Initial Recovery Phase are demarcated from the beginning of the sustained process of societal reconstitution by a Final Emergence Phase, during which adaptation by individuals, as individuals, to persisting weapons effects ceases to be an important concern. It is only at this point that sustained activity in the whole environment of society can begin, and that many constraints upon behavioral possibilities, at levels of society, can be relaxed. It may be convenient to think of the time period beginning with First Emergence Phase and concluding with final emergence as the Phase of Initial Social Reconstitution, a time when both outside and within shelters and shielding zones, the social processes requisite to establishing a sustained effort in the whole environment are fully initiated.

As Final Emergence Phase is completed, the Phase of Reconstruction and Reconstitution can begin. During this phase, the reestablishment of the social and physical facilities for a growing society in dynamic equilibrium becomes the principal focus of the efforts mediated by the behavioral systems. (The minimum desired outcome of this phase may be the establishment of the capabilities for a self-reproducing set of behavioral systems in static equilibrium.) Upon the completion of the Phase of Reconstruction and Reconstitution depends the beginning of what may be called the Final Recovery of the society. Of all the phases in the present time-dependent sequence, Final Recovery is the most difficult to define, in scientific terms, in the pre-attack research environment. Part of the ambiguity results from the possibility that the people may settle for or want a much different image of "normality" and "recovery" in the post-attack situation than they may have had in pre-attack society. The ambiguity rests, in the end, upon what is perhaps the central dilemma of organizing recovery in the American society: the need for a high degree of coordination of the efforts of individuals in

society, while insuring during this time of high coordination and discipline that a pluralistic, individualistic foundation for social life will be re-established. Here, final recovery becomes reattaining a highly valued pre-attack state. Ultimately, it is measured by the extent to which the pre-attack societal values and social processes which have formed the inspiration and guidance for organizing recovery efforts have once more come to control individual behavior in social interaction. The principal processes of the Final Recovery Phase, then, center around the re-establishment of the conditions under which the values and value orientations of the pre-attack social and cultural systems can be operative within the limits which these systems themselves impose and have imposed upon them.⁵⁴

During each of the post-attack time phases, each behavioral system will be the center of activities which are functionally important to society. It is the goal of the research studies to be developed here to understand more clearly the nature of these functional processes. Using the matrix which is now presented as Figure III-4, p. 169, it is possible to scan the behavioral sciences for possible studies of crucial social process. Given the functional role of each of the four systems in post-attack system, how can that functional role be projected into or studied in any given post-attack phase? Is it possible to suggest, if not to prove, what kinds of sequences of particular behavior and social process are prior in time, or superordinate in effect, to other social processes, and to gain, therefore, some notion of how, on the level of observed behavior, one kind of important behavior leads to or assumes another kind of important behavior? Is it possible to examine the requirements of the civil defense planner and the values of the American

⁵⁴ Note that within the ideology of pre-attack America, the institutional features of pluralism and individualism are taken as being crucially defining of the American social system. It is not entirely true, therefore, that this conceptual approach merely reifies and assumes these features, or that it advances sub rosa a particular interpretation of the American value system.

Figure III - 4

MATRIX FOR GENERATING RESEARCH STUDIES FROM PRESENT AND POSSIBLE
CONTENT OF THE BEHAVIORAL SCIENCES

POST-ATTACK TIME PHASES:*

MAJOR BEHAVIORAL SYSTEMS OF SOCIETY:	"Shelter" Shock and Shield				Initial Social Reconstitution				Restoration of Self-Generating Society			
	Shock and Shield				First Emergence				Initial Recovery			
Patterning Action												
ECOLOGICAL												
INDIVIDUAL												
SOCIAL												
CULTURAL												

*Length of Time Phase not drawn to scale of probable actual length of Time Phase in Post-Attack Society.

people, to see how studies which will illuminate their social meanings and feasibilities as recovery-directing goals can be done, within the constraints set by behavioral levels and time phases? These questions are only extensions of the initial question which prompted this essay: what are the social-behavioral effects of massive attack? By projecting the analytically differentiated whole society into a series of time-dependent post-attack phases, it becomes possible to speculate more coherently about the kinds of studies which might answer this question in significant ways. The minimum condition for intelligent speculation is a complete notion of the kinds of entities which will be subject to possible behavioral change, and which will exert a structuring effect over not only behavior in a given analytic level but throughout the system formed by society.

(3) Some Results of This Analysis

This conceptual approach provides one framework for generating and organizing a potentially vast array of research studies on post-attack social phenomena. This analysis began with some of the considerations which enter into assessing the criticality and strategicity of potential research studies. It continued with the presentation of a conceptual approach to complex society as a target of massive attack. This differentiation of levels of complex society provided a set of levels of behavior, each of which could be seen across a time dimension formed from constraints upon individual behavior and the reconstitution of the social structure in a possible post-attack complex society. This produced a matrix, whose cells form the loci for stating and assessing a number of particular research studies on post-attack social phenomena.

What has been developed is not, strictly speaking, a model of society, nor can the matrix be used in a mechanical way to generate research studies. Its usefulness lies only insofar as it helps the analyst and research designer to take full account of the complex interrelations of behavioral level and function which characterize industrial society, whether it is in normal times or under stress. It is just this complexity which has been so frustrating for

so many, as they have tried to imagine what American social behavior would be like following massive thermonuclear attack. The final test of the conceptual analysis undertaken here is how well it points toward what studies of likely post-attack social phenomena are significant, and how they are significant. Given the present state of social theory, at least some of the final attitudes about the usefulness of the scheme outlined here may depend on partially subjective judgments.

In the next chapter, the research studies which have so far been generated with the use of this conceptual approach will be outlined. Neither in this chapter nor the next one, is it possible to trace out all of the interesting theoretical and procedural problems involved in using this scheme. For that reason, the emphasis, in these chapters, has been first, on presenting the scheme, and then upon showing the results of the scheme as an analytical device to order substantive studies.

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Chapter IV

PROPOSED FIRST-ORDER RESEARCH STUDIES ON POSSIBLE SOCIAL EFFECTS OF MASSIVE ATTACK

SECTION 1

THE CONCEPTUAL APPROACH, AND THE PRESENTATION OF THE STUDIES

I. The Problem of Setting Limits to a Study

A. Some Practical Meanings of "Research Study"

The principal contents of this chapter consist of the forty-eight proposed research studies which have so far been developed with the aid of the conceptual approach which was outlined in the last chapter. As was suggested in that chapter, a number of theoretically and methodologically interesting problems of applying or refining the conceptual approach cannot receive full treatment in the present report. Instead, the present writing must be directed more toward presenting the substantive research program which has evolved, and toward suggesting the kinds of important findings about the social effects of massive attack which might come from this behavioral science research.

Both the power and some of the difficulties of the conceptual scheme lie in the fact that the scheme allows for the development of a number of studies at a given level of behavioral organization, while simultaneously placing each study in relation to others both within the same level and in other levels of behavioral organization. One of the next tasks in the development of the scheme and in the demonstration of the way it systematically interrelates particular studies with other studies in other levels is to show more precisely the nature of the linkages among studies and

across levels, through post-attack time. Indeed, this is part of the even larger task in social theory of spelling out the meaning of the concepts of the "hierarchical specification of action" and "system."

One of the difficult dilemmas of defining a research study within the framework of the kind of conceptual approach which has been taken here is that the larger frame of reference emphasizes the placement of the study within a set of other studies which, if done, might contribute significantly to understanding the full meaning of the study. Thus, it sometimes becomes very difficult to set limits on the study, for if the study exists within a larger framework, the framework suggests analytic and empirical pathways toward the content of other areas. As the researcher travels these pathways, he gradually recedes from the substantive focus and content of his first study. Yet, how is he to stop? What constitutes a set of limits to his first study? Without following suggestive leads which may have come from seeing the placement of the study in a larger analytic frame, the researcher may tend toward a naive orthodoxy or sterility in pursuing overly narrowed substantive content. But it is even more clear that if he follows out every relation, his research never ends.

The problem of setting limits to a study on the analytic level is paralleled by the problems of clearly defining a research study as a process of organizing human action toward ends. In a very practical sense, a research study is a set of perceived tasks, organized within a system for allocating intellectual inputs and distributing intellectual outputs through one stage or several stages, toward ends, represented in the organization of previously unstructured knowledge and the test of hypotheses or the development of propositions about the real world. As a process of organizing human action toward ends, a research study does not exist as an isolated complex of thoughts or behaviors, but as part of

a set of ongoing social processes which define its research environment. In defining research studies, it is common to consider a "study" as a neat package, consisting of a coherent intellectual tradition, a set of articulated guiding hypotheses, propositions, or general orientations, a lone scholar-scientist and his "team" (if it is conceded that the principal investigator may find it useful to have others working for him), and, ultimately, "findings" or "results." On the analytic level, the isolation of this neatly perceived, idealized research study ends when it is perceived that there may be relations of the subject matter to other subjects, not only within the discipline but across disciplinary lines. The kind of conceptual approach presented in the previous chapter has a special tendency to make just this kind of inter-disciplinary connection of one study to another.

The analytic and inter-disciplinary relations which destroy the isolation of the idealized, unitary image of the research study being pursued by its lone man of science sometimes produce particular organizational capabilities for doing research, which may drive the research in directions not anticipated if the study is considered as an idealized entity, in vacuo. In the university world, industry, and government, "institutes" have emerged to rival disciplinary departments. These institutes orient the efforts of their scientists toward complexes of related problems and problem-areas, and away from the strict practice of disciplinary specialities as specialties. Frequently, workers with many different backgrounds and interests come together in the institute format, and within some institutes, the internal ideology rewards the pursuit of a research idea into disciplinary or subject matter areas which may have seemed at the outset of the investigation to be rather remote. The contemporary movement toward institute formats for organizing research efforts

reflects the increasing awareness among many workers that it is possible to take practical, administrative recognition of what is already known in analytic and theoretical terms --- that there are many possible relations between subject areas for inquiry and the knowledge, methods and intellectual traditions which are necessary and relevant for defining research within them.

The analytic and organizational pressures toward establishing relations among research studies can be illustrated by considering some of the meanings of doing research on possible population migrations which might take place at various times following a massive thermo-nuclear attack on American society.¹

Especially as a result of wars, famine, sudden climatic shifts, and political or social pressures, large scale population migrations have occurred in human society. The attention of those interested in the social effects of massive attack is drawn to possible pressures toward population migrations because the possible ecological, environmental conditions following possible massive attacks seem to be so much like those which have been associated with large scale migrations in the past. Thus, a "research study" on population migrations emerges from knowledge of the recurrent phenomenon of large scale population movements accompanying rapid shifts in the ecological balances which have sustained society. It would seem that studies of possible pressures toward population migration typify the kind of study of changes in the ecological system of society which may result from massive attack.

¹See Study 2.2, "Population Migrations,"
This illustrative discussion of migrations has gained from conversations of the author with Dr. David M. Heer of the University of California (Berkeley), who has been projecting possible post-attack demographic characteristics and pressures toward population migrations, for American society.

Yet the social conditions which may stimulate large scale population movements must not be forgotten. Particularly if war and sudden destruction create the altered environment which has been associated with migrations, the social structure which previously held individuals in local and community life patterns may also be altered, freeing individuals from old local constraints and possibly contributing toward individual sense of disorientation in the world. To what extent will individuals now want to go elsewhere, or to wander? To what extent will they experience competing pressures from social ties which have suddenly become salient in the absence of community structure, of which have been improvised to meet needs for social organization? It seems now that the student of large population movements will want to consider the kinds of social structural constraints on or pressures toward migrations which may be associated with changes in the ecological situation of society, and to introduce social process and structure as a behavioral level upon which to search for pressures toward migration.

If the purpose of the research study on migrations is to predict or control pressures toward migration, it will be necessary to go a step farther. A study of the ecological, environmental, and social structural conditions attending large scale migrations could end with descriptions of the conditions which have been associated with migrations, or generalized propositions or predictions about when migrations are likely to occur. But what processes control the dynamics of migrations by large groups of people? It takes time for large numbers of individuals to change their residential locations, even when there has been sudden calamity. Is it possible to determine how migrations build up and gather momentum, or how they might slow? Under what concrete conditions is "moving away" or "going" perceived as a meaningful or desirable thing to do in one's

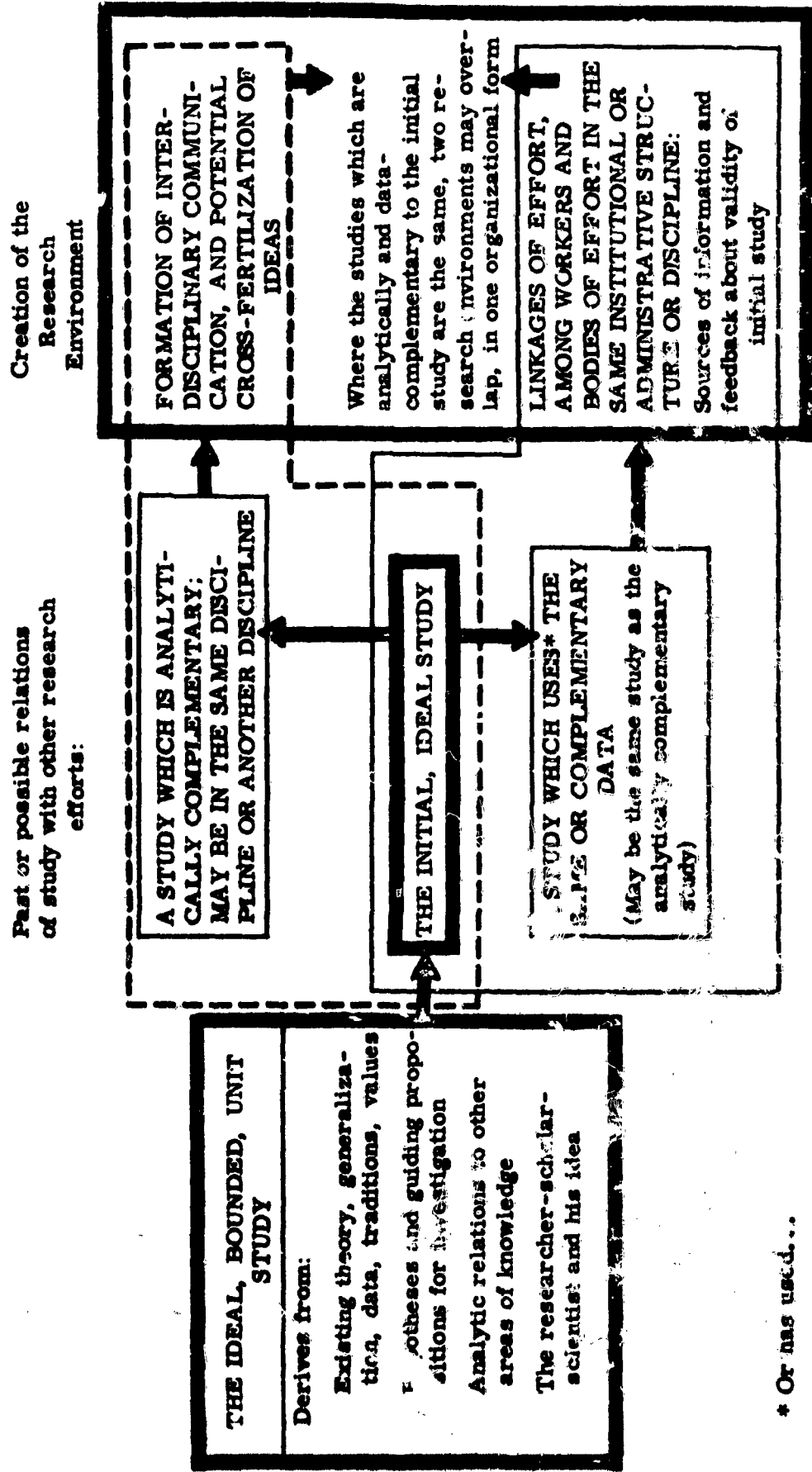
immediate life situation? How does one learn about where one can go, how he can get there, why he should go there? Here it may be important to consider the conditions under which there might be relatively high degrees of communication among migrants and potential migrants. How are communications maintained among the members of a population with a high degree of potentiality for migrating? How does communication from others who may be going, thinking of going, or already gone help to create within individuals the perception of migrating as an action alternative, or precipitate individuals' feelings or decisions to migrate? What are the immediate constraints that are great enough to nullify the effects of communication from those who have migrated? What, in turn, nullifies these constraints?

From a study which is initially demographic in its emphasis, the researcher can move toward studies of the social psychology of communication processes in stress situations among large groups of people. To understand the processes which are behind population changes reflected in changes in characteristics on the demographic level, the student finds himself making empirical links between levels which affect the organization of individual behavior. A study of possible post-attack migratory phenomena rather quickly becomes subject to pressures for broadening out beyond descriptive or projective demography.

Because it is so easy to see research studies as isolated, ideal packages, Figure IV-1 is presented on page 183. This figure schematizes visually one way in which the "unit study" is translated into ongoing research activity. In the translation of a study into research activity in this particular case, the study acts as a stimulus for the crystallization of a total research environment which plays a significant role in determining the final content and further directions of the research study. It can

Figure IV - 1

CENTRAL ASPECTS OF THE TRANSLATION OF A "STUDY" INTO RESEARCH ACTIVITY,
IN RELATION TO OTHER STUDIES



* Or has used...

be said that one of the crucial processes in determining the outcomes of a program of particular research studies is creating an adequate total research environment around each study, and, by creating the possibilities of cross-fertilization among studies within environments or among environments, creating a research community. An ultimate goal of the present program of post-attack research is to have the analytic linkages among substantive content areas of research possibilities translate into the communication processes of a research community where, from time to time, the existence of one study can influence the evolution of another.

B. The Organization of This Chapter

In order to present the forty-eight research studies, which have been identified and described to date in a degree of detail sufficient to suggest their interrelations into a total research program as well as to point to the complexities of the possible behavioral phenomena with which many must be concerned, there are a number of special devices in this chapter.

First, the chapter is divided into four major sections, the last two of which would normally constitute either major chapters in their own right or appendices to a whole volume. Following the present introduction, Section 2 provides an index or listing of the titles of the forty-eight studies. Both longer and shorter versions of titles of the research studies are listed in order to provide definitive reference lists of titles to which to refer in identifying or discussing studies, or to enable an easier quick scanning of the total program as it now stands. Sections 3 and 4 together provide the principal statement of the research studies which were developed with the aid of the conceptual and theoretical approaches presented in the previous chapter. Section 3 contains fourteen descriptions of proposed first-order

research studies, and a brief discussion of some of the problems which have been experienced in developing a format in which to define research studies. Many of these studies have already been used to stimulate the definition and development of research projects on the social phenomena which may follow massive attack. Section 4 consists of thirty-four proposed research studies, outlined and discussed within a standard, simplified format. The structure of this format was influenced by some of the lessons learned in developing the somewhat longer description of studies in Section 3. There are no formal distinctions between the fourteen studies described in Section 3 and the thirty-four studies described in Section 4. Considerably more time and effort went into the first fourteen descriptions with the result that their descriptions are far more comprehensive and detailed than the latter thirty-four. For this reason alone, are the two sets of studies distinguished.

Attempts have been made to ease the reading of these study descriptions by those who do not feel themselves especially familiar with the language and issues of the behavioral sciences. In Section 3, material which is of interest primarily to specialists has been segregated in the text through single-spacing, in a number of studies. In Section 4, a general attempt has been made to strike a level of language which is meaningful for both the researcher and the policy-maker and administrator. It has been very difficult, however, to keep these study descriptions at a uniform level of language and detail. This has been due in no small way to the great difficulties in defining research where phenomena are often interrelated, where many kinds of data and research orientation seem relevant, and where the ultimate validating criteria for a research study

lie in social conditions which have not yet been fully experienced.²

To aid in visualizing the entire program of studies, as they occur in the matrix which was used to develop the program, Chart IV-1 has been included on page 199. This chart not only suggests the proportion of the total number of studies which occur in each major behavioral system of society, but it also shows the post-attack time phases in which each study occurs. To say that a study occurs in a post-attack time phase means that a study has as its subject behavior which may be expected during one or several time phases, and which therefore becomes a matter for the civil defense planner or administrator to consider during one or several time phases. Chart IV-1 shows, for each of the forty-six³ studies which deal initially with behavior characteristic of a major behavioral system of society

²The problem of language constantly arises in reports which outline research and which are addressed to the researcher, but which will also be read by informed and responsible laymen. In outlining a number of research studies for the Institute for International Order, in the general subject area of "National and International Decision-Making," Snyder and Robinson remark:

"This report is addressed to fellow professionals. Hence we have felt free to use a technical vocabulary. However, if the readership is as broad as we hope, some will no doubt find the language awkward in places. We have tried to communicate ideas clearly, but we were unable to imagine an 'average reader'."

Richard C. Snyder and James A. Robinson, National and International Decision-Making: A Report to the Committee on Research for Peace, Program of Research No. 4, New York: The Institute for International Order, n. d., "Acknowledgements".

³Two general studies fall outside the four categories of behavioral systems.

the time periods following massive attack when the behavioral subject matter is thought to be most likely to occur as distinctively recognizable behavior. The study subject-title is placed in the post-attack phase when the behavior of the study is hypothesized to occur first in post-attack time; the arrow drawn into later post-attack phases stops in the column of the post-attack phase when the behavioral subject matter is probably likely to disappear as distinctive behavior.

An inspection of Chart IV-1 will reveal it to be the source of a number of hypotheses, assumptions, and conclusions about what behavior will occur when in post-attack time, and, indeed, of hypotheses concerning the general nature of societal recovery itself.⁴ Note, for example, that the boundary between Reconstruction and Reconstitution and Final Recovery is a dashed line; this suggests that the transition between these two phases is difficult to perceive and may be, in reality, only gradual. Note also the number of arrows across time phases which stop in Reconstruction and Reconstitution. Does this imply that some or all of the behaviors which disappear during the end of the Reconstruction and Reconstitution Phase form preconditions for society's entering the Final Recovery Phase? It may be that the simultaneous disappearance or translation of these behaviors or social problems during the Reconstruction and Reconstitution Phase would give a firmer indication of a phase boundary between this phase and Final Recovery. On the other hand, the long term nature of the Reconstruction and Reconstitution Phase (which has not been drawn to scale in Chart IV-1) may spread out the disappearance of the behaviors and social problems

⁴Chart IV-1 is the only place in this chapter where the hypothesized incidence in post-attack time of each behavioral subject matter of each study is systematically presented.

which phase out in Reconstruction and Reconstitution, thus blurring the transition to Final Recovery as reflected in the behavior considered by the various studies, particularly as the transition is viewed between systems with the same functional primacy.⁵ In considering the problems of assessing the criticality and strategicity of particular research studies, there will be frequent occasion to consult this chart.⁶

⁵ See the discussion on pages 71-74.

The implication here is that if behaviors phase out over long periods during Reconstruction and Reconstitution, it may be possible to discern differences in rates which are characteristically dependent on systems only among systems with different functional primacy and not among system levels of behavioral organization. The hypothesis here would be that phasing out of behavior differs only between the pair of systems with maintenance primacy and the pair with adaptive primacy. Thus, over long enough periods of time, phasings out of particular behaviors may be discernibly different between the ecological system and the individual system, but not between the individual system and the social system, which have the same hypothesized functional primacy in post-attack time. The issues raised here will be of direct concern only to the theorist and advanced student of societal recovery indicators.

⁶ See the discussion of criticality and strategicity on pages 69-70.

II. Further Development of the Research Approach, and Problems in Estimating Criticality

A. The Inherent Indeterminacy of Present Attempts to Assess Criticality

One of the values in developing a total program of research studies instead of a set of isolated studies lies in the possibility that the program contains organizing principles or assumptions which should help the researcher and planner know what particular studies have priority over other studies, in or outside the program, that might be done. Where the assumptions and background framework in a research program have been definitively clarified, the program, by its very existence, represents at least an implicit assertion that each study within it is important and worth doing. Both the studies and the program framework should enable the researcher and policy planner to justify selecting a study within the program for the commitment of research funds, and to defend that commitment against studies not in the program and for which claims might be advanced. In a field where the state of the art is relatively well advanced, it may be reasonable, in fact, to expect the research program to have anticipated these other studies, and to have excluded them already as being low priority studies. Few fields are, or probably should be so far advanced, for there are serious dangers in being too rigid in the assignment of priorities to research tasks, especially when it must be acknowledged that research from a low priority task might produce results which suddenly change everyone's perceptions of what is and is not low priority research.

The present program of studies on the possible social effects of massive attack has an inner coherence which results from the fact that it was developed from a conceptual approach for generating hypothetical states of society in the post-attack situation, where there was no possibility of

direct verification and validation of the social processes being projected. Four levels of behavioral organization were discriminated, and for each one, the nature of its possible functional primacy was hypothesized for post-attack society. Then each level of behavioral system was projected through a series of post-attack time phases. With this matrix, it was possible to look for the kinds of behavior which would occur at each system level in post-attack time, and to consider the kinds of social and individual resources or problems represented in that behavior. Since the matrix is built by projecting an analytically closed system for describing society through a series of time-dependent phases, there is a strong presumption that each process revealed by a research study is "critical" to the maintenance or adaptation of the system.

This would be true if the conceptual approach could be said, with certainty, to be more than a way of making a series of simultaneous projections and hypotheses about possible post-attack states. But the validity of this conceptual framework is itself subject to further empirical specification, test, and refinement. It is not a complete theory or set of generalizations about societal functioning. Thus, the very studies which are developed with the help of this framework may, when empirically explored, turn out to deal with functional processes which are less critical to the maintenance or adaptation of the social system. It was necessary to resort to the conceptual approach outlined in the previous chapter in the absence of definitive social theory which would adequately project a closed set of high priority studies, and in the absence of a sophisticated notion of "societal recovery" from massive attack which would tell the investigator and planner what social processes were "critical" to recover. Therefore, since it was necessary to use a partially speculative approach for hypothesizing

crucial areas of social phenomena following massive attack, and to use this scheme to organize a variety of kinds of data and generalization about human behavior, there is a circularity in trying to decide at the present stage of work on the final degree of criticality and strategicity of each research study. The conceptual approach has been used heuristically to point to possible substantive empirical research. Among the side effects of this research will be a clearer understanding of the kinds of behavior which may occur in the post-attack world, and a clearer notion of the functional requirements of a society suffering massive attack. These findings may modify the whole conceptual orientation which was used to generate the studies, new or previously excluded studies may emerge as being more critical than studies which have been done, and new priorities in research may emerge. That this could happen points to the way in which initial imputations of degree of criticality depended merely upon the original studies' having been discerned, within the framework of a now modified conceptual scheme for looking at possible social process.

Thus, there are at least two kinds of indeterminacy built into any present efforts to assign criticality weightings to the studies which have been developed in the present chapters. First, studies were perceived within the framework of a conceptual scheme which drew the analyst to them. There was at least a partial tendency for the studies to be defined because the conceptual scheme used to scan the field implied them. Thus, since the studies depended upon the scheme in some sense, each study has a strong presumptive claim to high criticality. Secondly, since the conceptual scheme is heuristic and not definitive, research findings from the particular studies may modify its implicit assumptions about social structure and process, with the effect of shifting the analyst's perceptions of what is and is not critical social process.

B. Levels of Behavioral Organization, the Post-Attack Time Incidence of Studies, and Further Investigations of Criticality and Strategicality of Studies

If, in fact, there is a good likelihood that the conceptual approach and the program of studies have covered at least a large proportion of significant research alternatives, and if research resources, including time with which to plan for massive disaster, remain scarce, then there is value in trying to develop systematic ways of assigning criticality to particular studies. The problem of assigning criticality and strategicality weightings to particular studies is now being systematically explored, and more detailed discussions of this problem will appear later in this study of post-attack behavioral research needs. It is possible, however, to suggest the lines along which the problem of assigning weightings of criticality and strategicality is being clarified.

In assigning these weightings, much more needs to be known about the degree to which various social processes in the post-attack situation are time dependent. Looking at Chart IV-1, a number of interesting characteristics of the total research program emerge. These are summarized in Figure IV-2, on page 193.

In assessing criticality, what are the possible relations among and meanings of the differences in post-attack time phases at which studies begin and end? Is it possible to show that there are categories of social process which must occur before other social processes can occur, at the same behavioral level or on different behavioral levels, and that one category of social processes is therefore the precondition for other categories of social processes?

Figure IV-2

SELECTED CHARACTERISTICS OF THE POST-ATTACK RESEARCH PROGRAM

- (1) 33 of the 46 studies within the matrix begin in the Shelter Phase, and only 18 of the 46 studies are included in all post-attack time phases.
- (2) 15 of the 46 studies begin in the Shelter Phase and end in the Reconstruction and Reconstitution Phase. This phase is the locus of the endings of more characteristic complexes of behavior (18 study endings) than any other phase except Final Recovery (with 25 study endings).
- (3) Of the 13 studies that have behavioral foci that do not begin in the Shelter Phase (4 of 46 begin during First Emergence and 9 of 46 begin during Initial Recovery), 8 of the 13 end in Final Recovery.
- (4) 27 of the 46 studies concern behavior in the individual or social systems, the "behavior-social action system," and the systems with adaptive primacy; 19 of the 46 studies concern behavior in the ecological or cultural systems, the "behavior patterning systems," and the systems with maintenance primacy. Of the 27 studies on behavior in the individual or social systems, 10 begin outside the Shelter Phase, whereas in 19 studies in the ecological or cultural systems (the behavior patterning systems), only 3 begin outside the Shelter Phase. This difference in ratios --10/27 as opposed to 3/19--may reflect the fundamental difference between behavior-social action systems and behavior patterning systems, as these systems determine behavior in society. The fact that the majority (27) of the studies are in the behavior-social action systems with adaptive primacy may reflect an assumption that it is easier to study and plan for the social effects of massive attack at those levels of behavior which include the First Level of Visible Behavior.

There is a strong presumptive case that Studies 3.7 and 3.8, which deal with processes of emergence from the Shock-and-Shield Phase, are crucial to the satisfactory restoration of social life outside shielding systems. How can these two studies illuminate the general characteristics of the social preconditions for later social states, in a society moving toward recovery?

The differences in the extent to which behavior and behavior studies begin after the Shelter Phase, when systems with adaptive primacy are compared to systems with maintenance primacy, suggest that there are fundamental differences in the structure and sequences of the processes which support the most general social functions in post-attack society. To assess the criticality of studies within the ecological or cultural systems, as contrasted with the individual and social systems, it may be necessary to develop somewhat different notions of criticality than those which depend upon possible basic time dependencies in studies on system levels with adaptive primacy. It can be hypothesized, for example, that each study which pertains to a system with maintenance primacy deals with a basic process which persists throughout all post-attack phases and which changes only in form, while studies of behavior on system levels with adaptive primacy deal with behavioral processes which develop and vanish, to be replaced by other processes. If this hypothesis is supported, as clearer notions of social process in a "recovering" society evolve (particularly from Study 1.1), then assessments of the criticality of a given behavioral process in the whole society will depend on showing how behavior patterning processes interlock on the ecological and cultural levels, as contrasted with showing how they may be in strictly time-dependent sequences on the individual and social levels.

This possible distinction among levels may be offset by what appears to be the fact that there are studies--and, therefore, distinctive complexes of

behavior and behavioral management problems--which end in the Reconstruction and Reconstitution Phase for each of the four behavioral levels. This suggests further need to refine the concept of criticality and apply it to each of the studies and especially to other studies which may be developed. For example, Study 2.6, dealing with ecology and epidemiology of communicable diseases and their vectors, seems to involve problems of behavioral control which are crucial before final recovery can occur. Without adequate control of disease vectors, there can be no stable state of recovered society, and the achievement of a stable control over communicable disease therefore becomes a precondition for transition from the Reconstruction and Reconstitution Phase to Final Recovery. But it is clear that the social practices attending the control of communicable disease never vanish within a viable, complex social system. They merely subside as a crucial issue of system maintenance, as they become stable processes. This is in sharp contrast to what seems to be the replacement of at least some behavioral processes by other behavioral processes in the adaptive systems, as when emergence behavior concludes, or as when "behavior of the unprotected" (Study 3.6) ceases to be salient, possibly partly as a result of continuing controls deriving from the cultural system being directed toward it (Study 5.12, which suggests problems in the translation of the cultural values of democratic equality of sacrifice and risk to deal with individuals who may have post-attack claims founded on widely ranging bases).

It may be that for behavioral process in the adaptive systems, the crucial issue in imputing criticality to a study may be whether that study treats behavior which is a necessary behavioral process, in a sequence of other processes, to the adaptation of the society as a society. This might

contrast with the problem in imputing criticality to studies of behavior patterning in the maintenance systems, where criticality estimates might begin with the judgment as to whether the behavior patterning subject to a given study deals with patterning necessary to the continued preservation of the society as a distinctive society with distinctive styles and values. This contrast might be much more accurate when made among the adaptive systems and the cultural system, than when made among the adaptive systems and the ecological system, since it is quite clearly assumed in the ecological studies that there are minimum conditions for the maintenance of any kind of society.

It is possible, in fact, that criticality of a study is imputed according to the basic characteristics of each behavioral system as a set of targets. Exactly the same linkages among the four systems of behavior as were depicted in Figure III-3 of the previous chapter may govern imputations of both criticality and strategicity of studies of behavior within these systems. Figure IV-3, suggests how the points of Figures III-1 and III-3 of the previous chapter might be combined.

These remarks have centered on the issues of defining criticality, but they also pertain to the issue of deciding strategicity. Since they are speculative, and are included only for the purpose of suggesting the directions in which inquiry is continuing, no special purpose will be served, in the present essay, by showing the range of issues important to imputing strategicity. Because of the way in which strategicity is partially dependent on criticality, a number of problems in defining and imputing strategicity should be apparent without elaborate discussion.

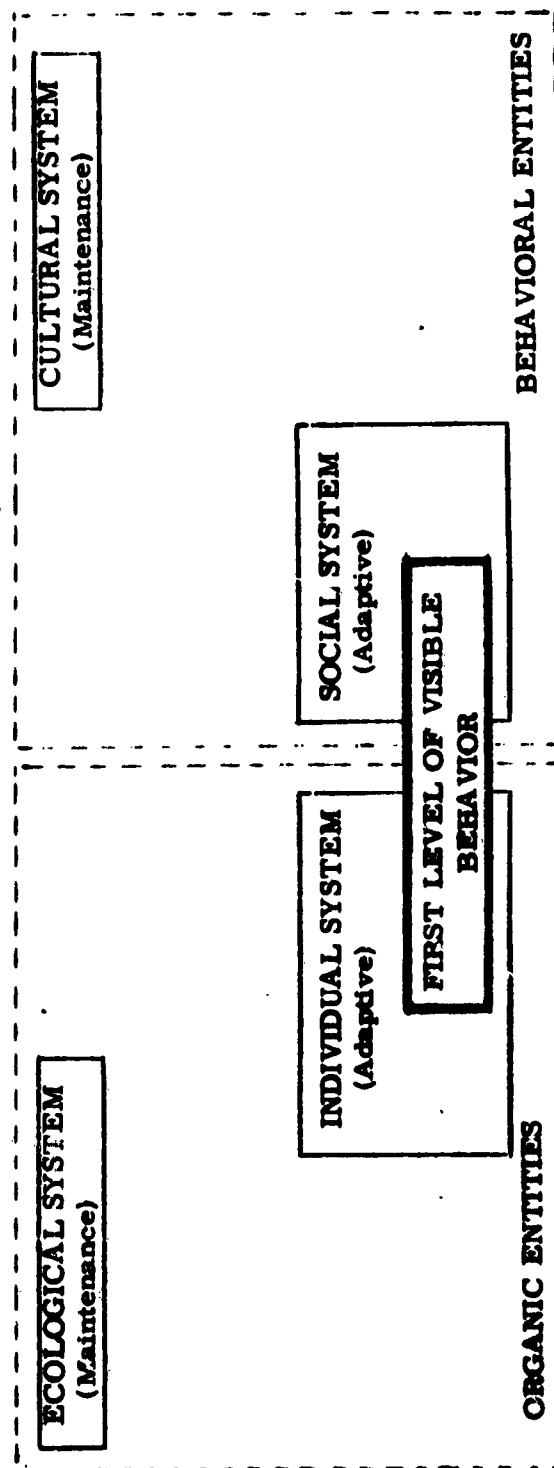
The purpose of the preceding discussion has been to suggest how a number of issues in defining and imputing the criticality of a

Figure IV - 3

BEGINNING THE PROCESS OF IMPUTING CRITICALITY TO A PARTICULAR STUDY: POSSIBILITIES FOR FURTHER INVESTIGATION

If the study occurs in systems which provide organic entities, then criticality of a study depends initially on whether it can be ascertained, probably initially on analytic grounds, that the subject patterning or behavior contributes crucially to the maintenance or adaptation of organic entities. This criticality estimate will be especially dependent on the behavioral scientist's estimate.

If the study occurs in systems which provide behavioral entities, then criticality of a study depends initially on whether it can be ascertained, probably initially on analytic grounds, that the subject patterning or behavior contributes crucially to the maintenance or adaptation of distinctive behavioral entities. This criticality will be especially dependent on the policy-maker's estimate as to whether the subject of the study contributes crucially to the maintenance of a distinctive American style and value system.

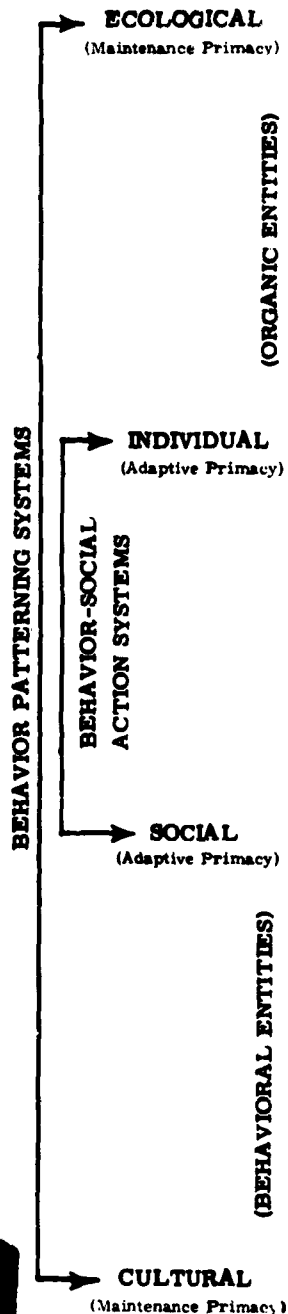


study are interrelated, and how they are made especially difficult by lack of adequate means for (a) projecting post-attack social states with high certainty, and (b) showing how these social states might be guided by recovery processes which are the outcomes of the structural requirements of post-attack society, as mediated and implemented by articulated recovery goals. There is at least one inherent circularity and indeterminacy in trying to impute criticality and strategicity which directly results from these deficiencies. This is the circularity and indeterminacy which comes from the need to derive research studies from a conceptual approach to post-attack society which is at least partially dependent for its further refinement on the outcome of the particular studies. Perhaps what has been shown here is that in developing a program of post-attack behavioral research studies, the analyst engages in an intensified version of that circular process of definition, test, and redefinition which is characteristic of all scientific work. But in trying to decide to make judgments about what it is important to do, he must therefore be especially clear about the ways in which his assumptions and the general circular process of defining his picture of post-attack society will predispose him to see certain social processes as "critical" or "strategic," and will thus influence, on a priori grounds, his decisions to allocate effort. The present remarks are to suggest that it is premature to make firm decisions about the criticality and strategicity of many studies that might be done. If decisions must be made, they can not claim more justification than can be derived either from the present state of knowledge about post-attack society, as influenced by as yet to-be-solved problems in thinking about post-attack society, or from the present willingness of the civil defense planner and policy-maker to make their policy needs and legitimate hopes for American society clear to the behavioral scientist.

GENERAL STUDIES

- 1.1 (1) Conditions and Parameters of Recovery and Societal Vulnerability
- 1.2 (2) Civil Defense as a Post-Attack Tension Management System

MAJOR BEHAVIORAL SYSTEM OF SOCIETY:



"SHELTER"		FIRST EMERGENCE	
SHOCK AND SHIELD			
2.1	(3) Post-Attack Demography		
2.2	(4) Post-Attack Migratory Pressures		
2.3	(5) Urban Ecological Patterns		
2.4	(6) Agricultural Life		
2.5	(7) Environmental Constraints on Communication		
2.6	(8) Ecology of Disease and Disease Vectors		
2.7	(9) Consequences of Pre-Attack Evacuation		
3.1	(10) Psychological Attributes for Adaptation: Learning, Motivational		
3.2	(11) Persistence of Debilitating Fear		
3.3	(12) Adjustment to Personal Loss		
3.4	(13) Expected Organic and/or Psychiatric Disabilities		
3.5	(14) Mental Health Requirements		
3.6	(15) Responses of Unprotected		
3.7		(16) Individual Emergence into Reco	
3.8		(17) Characteristics of Emergence I	
3.9			
3.10			
3.11			
4.1	(21) Role Structure and Reward-Status System		
4.2	(22) Adaptive Capabilities of Formal Organizations		
4.3	(23) Group Ideologies and Support for Recovery		
4.4	(24) Extremist Collective Behavior and Movements		
4.5	(25) Preserving and Restoring Democratic Processes		
4.6	(26) Social Structure and Post Attack Command-Control		
4.7	(27) Hypotheses on Crisis and Social Integration		
4.8	(28) Voluntary Associational Resources for Social Organization		
4.9	(29) Uses of Small, Primary, and Reference Group Phenomena		
4.10	(30) Survival of Family As Organizational Form		
4.11	(31) Controlling Social Deviance		
4.12		(32) Conflicts Between Protected a	
4.13			
4.14			
4.15			
4.16			
5.1	(37) Preserving Specific Democratic Values		
5.2	(38) Pressures on Fundamental Values and Value Orientations		
5.3	(39) Religion as Post-Attack Mediator and Controller		
5.4	(40) Educational Requirements and Processes		
5.5	(41) Roles of Rites of Passage		
5.6	(42) Loss of Records and Recorded Culture		
5.7	(43) Legal Resources and Restoration of Civil Life		
5.8	(44) Nutritional Needs and American Dietary Habits		
5.9	(45) Functions of Recreation and Play		
5.10		(46) Re-emergence of Popular C	
5.11			
5.12			

CHART IV - 1

MATRIX SHOWING OCCURRENCE OF PROPOSED

INITIAL SOCIAL RECONSTITUTION

RECONSTRUCTION AND RECONSTITUTION

FD
REC

[illegible]

OF PROPOSED STUDIES, ACCORDING TO SYSTEM REFERENCE AND POST-ATTACK TIME PHASE

[illegible]

STUDIES, ACCORDING TO SYSTEM REFERENCE AND POST-ATTACK TIME PHASE

SECTION 2

AN INDEX OF PROPOSED FIRST-ORDER RESEARCH STUDIES ON POSSIBLE SOCIAL EFFECTS OF MASSIVE ATTACK

To facilitate access to the study descriptions, the listing of study titles and number designations is provided in Table IV-1.

Two studies are "general studies," in the sense that they do not especially occur in one of the four system levels of behavioral specification and attack effect, but instead develop issues and data common to conceiving of attack impact and societal recovery on all system levels. The remaining forty-six studies are grouped under their appropriate system level headings.

Two study titles are given for each study. The first column in the listing gives a short title which is used to simplify referring to a particular study. The second column gives the longer title which provides a more complete description of the nature of the study. Each study is designated by a decimal notation which appears at the far left of the listing. The number to the left of the decimal designates the system level of the study; the number to the right is simply a serial numbering within system levels. The page number of the beginning of the study description is given in parenthesis following the shorter titles.

Table IV - 1
LISTING OF STUDY TITLES

Study No.	Shorter Designating Title	Longer Descriptive Title
<u>GENERAL STUDIES--The general issue of defining societal response to massive attack, on the analytic level formed by the whole society and its system.</u>		
1.1*	Defining Societal Recovery (211) [#]	Assessing the conditions and characteristics and defining the parameters of societal recovery
1.2	Civil Defense as a Post-Attack Tension Management System (310)	Post-attack implications of civil defense as a stress and tension management system for American society
<u>THE ECOLOGICAL SYSTEM--The population, and patterning of behavior, in relation to the environment of the population</u>		
2.1*	Post-attack Demography (220)	The post-attack demography of American society
2.2*	Post-attack Migratory Pressures (330)	Pressures toward post-attack migration, and their management
2.3	Urban Ecological Patterns (311)	Long-term and short-term urban ecological patterns and processes
2.4	Agricultural Life (312)	Patterns of agricultural life, food production, and the rural-urban relationships
2.5	Environmental Constraints on Communication (314)	Environmental constraints on post-attack communication processes
2.6	Ecology of Disease and Disease Vectors (315)	Ecology and epidemiology of communicable diseases and disease vectors

* Studies asterisked are described in Section 3; all others are described in Section 4.

The number in parentheses refers to the page number on which the study description begins.

Table IV-1 (cont.)

2.7	Consequences of Pre-attack Evacuation (316)	Evacuation, as a pre-attack population management strategy, in its post-attack consequences
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THE INDIVIDUAL SYSTEM--Individual humans as behaving organisms

3.1*	Psychological Attributes for Adaptation: Learning and Motivational Requirements (236)	Required individual psychological attributes for responding and adapting to post-attack life requirements, especially learning and motivational requirements
3.2*	Persistence of Debilitating Fear (239)	Fear, and its persistence as a debilitating phenomenon
3.3	Adjustment to Personal Loss (317)	Processes of possible adjustment to the fact or the sense of personal loss
3.4	Expected Organic and/or Psychiatric Disabilities (318)	Organic and/or psychiatric disabilities expected from attack effects, including psychosomatic and hysterical symptoms, and their treatment requirements
3.5	Mental Health Requirements (320)	Mental health requirements in social policies to aid in enhancing individual adaptation to the post-attack world
3.6	Responses of Unprotected (321)	Immediate individual and collective responses of unprotected people to attack
3.7	Individual Emergence into Reconstruction (322)	Individual processes of emergence into reconstruction and recovery situations, after the Shock-and-Shield Phase of post-attack life
3.8	Characteristics of Emergence Leaders (323)	Required, desirable, and likely characteristics of leaders in the processes of emerging from the Shock-and-Shield Phase of post-attack society into the beginning of societal reconstruction
3.9	Problems of Motivation in Rebuilding (325)	Emergent problems of individual motivation to support and participate in societal recovery
3.10	Anomie in Post-attack Society (326)	Possible experience in anomie in post-attack society

Table IV-1 (cont.)

3.11	Child-rearing Variations as Chies to Response Capabilities (327)	Variations in pre-attack patterns of child-rearing, as sources of variations and problems in individual adaptive capabilities for post-attack living: identification and anticipation of individual vulnerabilities to attack shock and to stresses of post-attack society
THE SOCIAL SYSTEM--The structure and processes of society as a system of social interaction		
4.1*	Role Structure and Reward- Status System (244)	Role structure and role requirements in post-attack society, with special reference to the occupational structure and the reward-status allocation system
4.2	Adaptive Capabilities of Formal Organizations (329)	Formal organizations as organizational types for producing capabilities for adaptive social processes: capabilities and requirements in the case of the civilian and military bureau- cratic forms of industrial social organization
4.3	Group Ideologies and Support for Recovery (331)	Group ideologies and possible differences among groups in support of participation in reconstruction activities, or in general symbolic affirmation of reconstruction processes and goals
4.4*	Extremist Collective Be- havior and Movements (253)	Extremist collective behavior as possible response to and symptom of post-attack social conditions
4.5	Preserving and Restoring Democratic Processes (332)	Central problems in the preservation and restoration of de- mocratic institutions and organizational procedures and pro- cesses
4.6	Social Structure and Post- attack Command-Control (333)	Post-attack social structural capabilities and deficiencies in establishing required communication and command-control systems in post-attack society, particularly in view of the ultimate goal of recovery seen as implying the restoration of institutional pluralism in American society

Table IV-1 (cont.)

4.7	Hypotheses on Crises and Social Integration (335)	The test of plausible alternative hypotheses regarding the effects of crisis on social integration
4.8*	Voluntary Associational Resources for Social Organization (268)	Organizational resources for maintaining effective social coherence, control, and directed adaptive activity in post-attack society, especially latent resources within voluntary associational forms which may continue to exist in early post-attack phases
4.9	Uses of Small Group, Primary Group, Reference Group Phenomena (337)	Measures for preserving and utilizing small group, primary group, and reference group phenomena to support adaptive behavior in the post-attack social order
4.10*	Survival of Family as Organizational Form (280)	The degree of survival of the family as a basic form of social organization, and problems created by the disruption of family functions and family structure
4.11*	Controlling Social Deviance (286)	Controlling social deviance and "institutionalized" departures from social norms, including the question of whether there will be shifting definitions in the treatment and toleration of deviance in post-attack society
4.12	Conflicts Between Protected and Unprotected (338)	Possible conflicts between groups who have been protected and groups who have not been protected from attack
4.13	Restoring the Structure and Processes of the American Economy (340)	Probable resources and necessary resources, and the official and/or private measures required, to restore the fundamental processes and institutional structure of the complex American economy
4.14	Concepts and Hypotheses of "Amplified Societal Rebound" (341)	The meanings and limits of the idea of "amplified societal rebound" from massive disaster, and tests of the hypothesis of "amplified rebound"
4.15	Controlling Strains in the American Social Structure (343)	Controlling processes which have tended to cause or enhance "strains" in the American social structure

Table IV-1 (cont.)

4.16	Proportions of Defense, Non-Defense Workers (345)	Shifting proportions of members of defense and non-defense organization members in the population; mobilization, demobilization, redirection of individual effort, and resultant effects on social structure and social process
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THE CULTURAL SYSTEM--The cultural and value system as mediator and pattern of individual behavior and social processes

5.1	Preserving Specific Democratic Values (347)	The problem of preserving specific democratic values under varying forms and combinations of possible stress
5.2	Pressures on Fundamental Values and Value Orientations (348)	Pressures on fundamental values and value orientations in the American culture; controlling and guiding change
5.3	Religion as Post-Attack Mediator and Controller (350)	Value and organizational systems of religions as mediators and controllers of individual behavior in post-attack society
5.4*	Educational Requirements and Processes (289)	Educational requirements and processes in societal reconstruction and long-term adaptation to attack
5.5*	Roles of Rites of Passage (292)	The adaptive utility and necessity of explicitly preserving rites of passage; examples: the institution of marriage; social requirements for treating the dead or coping with the fact of the absence of the living and known loved one
5.6	Loss of Records and Recorded Culture (352)	Consequences of loss of records and a recorded culture, and means for the reconstruction of recorded culture and the interim meeting of needs caused by the loss of records
5.7	Legal Resources and Restoration of Civil Life (353)	The legal customs, requirements, and institutional resources of post-attack American society, with special reference to the resumption of semi-autonomous civilian activity; the continuity of pre-attack governmental obligations in all levels of jurisdiction
5.8	Nutritional Needs and American Dietary Habits (355)	Nutritional needs in the context of American food and dietary practices

Table IV-1 (cont.)

5.9	Functions of Recreation and Play (356)	Pressures on recreation and play, and the roles of these forms of outlet in post-attack adaptive behavior
5.10*	Re-emergence of Popular Culture and Its Content (299)	Re-emergence and play, and the roles of these forms of outlet in post-attack adaptive behavior
5.11	Economic Resources for Private Enterprise (359)	Economic resources for resuming private enterprise
5.12	Claims, Rights, of Sufferers and Non-Sufferers (303)	Claims and rights of sufferers, and the problem of social integration

SECTION 3

FOURTEEN DESCRIPTIONS OF PROPOSED FIRST-ORDER RESEARCH STUDIES

The scope of the task of attempting to develop an approach to conceiving the social effects of massive attack is reflected in the difficulty of sharply separating one possible research study from another. This difficulty lies ultimately in the fact that while it is possible to make and to sustain a number of important analytic discriminations among levels of behavioral phenomenon and organization, the first-order studies of possible post-attack behavior which are needed by the civil defense planner and administrator deal with behavior which is usually relevant to the understanding of attack effects on several levels of behavioral organization. This multiple relevance of the subject matter of many studies reflects the interdependence of the different types of social effects of massive attack. This same interdependence of effects implies, in turn, that many of the studies will be interdisciplinary. For many studies, there will be no unique body of data, generalizations, or methodology which will compel selection by the researcher, even though each study has been developed around problems and interests which characterize one discipline or a few closely related disciplinary specialties.

The study descriptions which follow were components of a larger effort to establish a sense of the limits on first-order research studies of the social effects of massive attack. The majority of these fourteen studies have already been used to stimulate behavioral science research efforts directed toward the

particular issues they raise.⁷ In developing these studies, several degrees of specificity were used. It was necessary to experiment with length and specificity of presentation, largely because so many of the problems to be discussed ramified so widely, and reinforced the ambiguities of setting limits to research studies on conditions which have not yet been fully experienced. As a result, there are varieties in the format in which the fourteen studies are now presented, and substantial differences in the length of the studies. To suggest the varieties of ways in which these studies might be defined, it has seemed useful to preserve the original differences in format and length. It is hoped, therefore, that in their present form, these fourteen studies will be a useful introduction to the problems of defining behavioral research on the social effects of massive attack.

The fourteen studies include studies from all four behavioral systems, and a general study on the problems of defining societal recovery from a massive attack. The studies not included in this group of fourteen studies are included in the group of thirty-four studies which constitute the body of Section 4. These thirty-four studies were written after the fourteen studies according to a standard format.

⁷ A number of behavioral scientists and scholars have discussed the contents of these fourteen studies with the author. He acknowledges, with great pleasure, the comments which Dr. Peter G. Nordlie provided for all of the studies, and the comments of Mr. Sidney G. Winter, Jr., on Study 1.1, the comments of Dr. Kingsley Davis, Dr. David M. Heer, and Dr. Jiri Nehnevajsa on Studies 2.1 and 2.2, the comments of Dr. Saul B. Sells, Dr. George J. Palmer, Jr., Dr. Lawrence E. Schelsinger, Jr., and Dr. Richard Myrick on Studies 3.1 and 3.2, the comments of Dr. Scott Greer, Dr. Richard L. Simpson, and Dr. Seymour M. Lipset on Study 4.8, the comments of Dr. Robert F. Winch on Study 4.10, and the comments of Rabbi Edwin Friedman on Study 5.5.

The study numbers of the fourteen studies described in Section 3 are as follows:

1.1	4.8
2.1	4.10
2.2	4.11
3.1	5.4
3.2	5.5
4.1	5.10
4.4	5.12

The remaining thirty-four studies are described in Section 3 beginning on page

Study 1.1

DEFINING SOCIETAL RECOVERY

(1) Subject for Research: Assessing the conditions and characteristics and defining the parameters of short-term and long-term societal recovery from massive attack

(2) Requirement for Study:

Intelligent planning to achieve a desired goal requires a coherent idea of the nature of the goal. In many situations where policy-makers plan for the future, the issue is not defining the goal itself, for it is frequently assumed, rightly or wrongly, that the goal is already known. Instead, the central issue of planning is to determine the kinds of means that are available and desirable for achieving the goal. On the other hand, in planning for societal recovery following massive thermonuclear attack, the question of the goal becomes paramount.

Definitions of post-attack societal recovery are, at present, generally implicit in post-attack plans. While planning for post-attack recovery deals with urgent short-run restorative measures, there is little overt recognition of the problem of defining either the long-run measures or the long-run conditions leading to a desirable final recovery state. Underlying the long-run thinking that is being done about how to achieve societal recovery is the relatively primitive, undifferentiated notion that American society will have made its recovery when it has returned to the form and functioning of pre-attack society. This implicit notion of societal recovery is rather appealing, but inadequate to guide recovery planning. Urgent short-run priorities may impose short-run allocations

of societal resources which appear to contradict the goal. Long-run evolutions in the form of society after attack may be harmonious with fundamental pre-attack institutions, yet depart in many particulars from the style of life known in pre-attack society. When the effort is made to project from the immediate post-attack situation to a situation where it is feasible to institute measures leading toward "final" recovery, the planning effort mires in the welter of ways for describing a complex, industrial society in full health.

(3) Objective of Study:

(a) Central Research Topic:

As a guide to recovery planning, the critical characteristics of societal recovery need to be made explicit. These characteristics should distinguish among a variety of possible post-attack recovery phases which may be imposed by the interrelations of varying rates at which different weapons effects attenuate, varying degrees of damage in the society, and varying priorities of resource allocation which establish the preconditions for later resource allocation. The definition of societal recovery should also include the many different ways in which societal form and process can be described. These methods for describing society may emphasize such economic measures as level of national income and gross national product, or they may utilize quite different measures. The different ways of measuring form and process in society must be combined in such a way as to enable planners to use the definition in developing recovery plans in the pre-attack period and to assess the recovery state at any point in the post-attack period.

The problem of arriving at a set of criteria for societal recovery is of special importance in planning for recovery where values which emphasize the enhancement of individual freedom guide social life. Indicators which suggest that American society is recovering from massive attack must reflect the extent to which the conditions for individual freedom have been reestablished. Here, the criteria of societal recovery should take into account the requirement that American values be preserved over the long run during recovery, even though the superstructure of society may undergo substantial change.

The result of this research should be an explicit set of criteria which enable responsible individuals to determine the varying meanings of societal recovery. These criteria will form part of the central basis for generating further research to be used in post-attack planning. When applied immediately to operational planning, these criteria will form bench-marks against which the basic requirements of specific recovery programs will be developed.

(b) Background of Study

Is societal recovery a function of the conditions under which the pre-attack gross national product and total national income have been achieved once more? Clearly more than this is involved, for an authoritarian society might achieve a rapid return to pre-attack levels of G.N.P. The case of the Soviet Union following World War II is instructive. If G.N.P. is taken as a principal criterion of "recovery", the society could recover its economic thrust without preserving democratic institutions.

If gross economic measures pointing to restored levels of output are insufficient indicators of processes which lead to recovery, could a more subtle measure be found for determining the conditions and processes of institutional differentiation which support democratic pluralism? Since de Tocqueville, there has been recognition among American sociologists that the proliferation of institutional and organizational forms --

especially informal and "voluntary" forms--has been related to the high degree of citizen involvement in fundamental American social and political processes. Perhaps societal recovery is related to the restoration of this institutional complexity, and the attending complex conditions for informal interaction within the American citizenry. Societal recovery will be partly a result of the extent to which a relatively free system of status and reward allocation based on achievement and opportunity can be reinstituted--and the extent to which it carries over from the pre-attack situation. Indices of societal recovery should have built into them ways of describing patterns of pluralistic institutional differentiation and the reemergence of a democratic system of reward and status allocation.

But here a "conservative" trend in the recovery indicators may seem to emerge. Does this statement of the sociological preconditions for democracy freeze the pre-attack institutional structure? Could it be said that this perception assumes that recovery requires the re-establishment of an institutional system, particularly a system of social stratification, that was only imperfectly functional in pre-attack society? Does the post-attack situation require or present the opportunity for innovation within a stable framework of values? If so, how can this innovation be described through a series of recovery phases leading to a final state of recovery? How can it be determined when basic values are being compromised by innovation--assuming that preservation of basic societal values is taken for granted? What measures of societal values are needed for societal recovery? What measures of institutional innovation and change are needed within this value framework?

The question of how to determine the survival and post-attack implementation of the pre-attack value system raises a methodological issue of considerable importance and sophistication for the behavioral sciences. Ultimately, it can be said that a measurable state of recovery is never achieved, if "state" means an enduring, stable, static social system. Inherent within the American value system and the particular institutional forms--for example, political, economic, military, social--which spell it out is the theme that the total social system is in dynamic equilibrium and constantly changing and evolving. What are the parameters of this equilibrium process? How do these parameters and other indicators help pre-attack and post-attack planners understand when a state of dynamic and self-generating equilibrium has been restored among the various components of society? What do they suggest about the conditions for rebuilding this equilibrium?

Recovery seems to be more than a set of social states, each measured by its own index and summed into an overall resultant condition. Individual indices, or an aggregate index developed as the result of a complex process of summation, must enable the planner to think about the restoration of changing and, in one sense, unstable conditions. But these conditions are ordered, and together form the conditions of social pluralism under which a democratic value system operates to affect individual patterns of performance. The understanding, projection, and measurement of societal recovery must depict the subtlety of the conditions through which a complex, industrial, democratic social order can be restored without overdetermining individual behavior. Whether this is, in itself, an unrealistic final goal of recovery depends on an extended analysis of the institutional and behavioral resources which will remain after massive attack.

The pre-attack state of a complex, industrial society is characterized by a high degree of stable structural differentiation. It is a reasonable hypothesis that the immediate post-attack situation will be characterized by a sharp drop in effective structural differentiation, and the emergence and/or implementation of a few highly specialized adaptive forms of social organization. Recovery, on this level of institutional analysis, is the restoration of the structural differentiation of an industrial order, since this structural differentiation is the framework for the many levels of reciprocally dependent relations which characterize human action in complex society. In the economic sector of social institutions, given the widespread loss of plant and other resources in the post-attack situation, it is reasonable to assume that the problem of restoring capital--on the consumer level, for example, encouraging saving and motivating the worker toward the restoration of the productive complex--will be central to restoring the economy as an organized sector of society. Recovery efforts must restore the balance among capital formation, investment, and consumption.

On the basis of a theoretical view of industrial society adequate to its complexity, enduring recovery of industrial society implies the restoration of complex degrees of differentiation and balance. For example, the general structural differentiation and particular capital management institutions of a complex society must be included in any consideration of the conditions of a dynamic, self-generating social system. Recovery will depend upon whether institutional and behavioral resources in these and similar areas can be adequately understood and utilized as part of a total, integrated effort at restoring the institutional balance and complexity of an industrial order.

As an analysis of the meanings and parameters of post-attack recovery proceeds, the recovery analyst may become aware that part of his definition of what constitutes societal recovery may depend on the extent to which he can consider recovery efforts as being tightly and centrally integrated. For example, individual consumers do not establish the conditions for capital formation in a complex economy. This set of conditions is the outgrowth of institutional pressures operating on a higher policy level. Yet much civil defense planning has emphasized, both in overt ideology and implicit assumptions, the need for enlisting the public and acting through the private and voluntary sectors of social life. While such citizen support is congenial to a democratic ideology, it is only partly relevant to the elite requirements of defining and directing societal recovery. The recovery analyst and planner face the paradox of thinking in society-wide and, not infrequently, in authoritarian terms, while seeking to plan for the restoration of democratic, self-generating and relatively planless institutional life in society. In the pre-attack situation, they must be aware of the unconscious pressures that may force them into defining recovery and recovery measures in ways which falsely and prematurely include mass participation in the processes of restoring democratic institutional conditions. A fine sense of the levels at which mass citizenship participation will be relevant to recovery is needed.

Beyond the complex descriptive and analytic problems in choosing the kinds of data and general indicators relevant to illuminating the possible characteristics of societal recovery, there is a challenging methodological and philosophical problem. This is the problem inherent in trying to develop descriptive and predictive tools for a situation of society which has not yet been experienced and which therefore necessarily remains hypothetical, from the viewpoint of the scientific method. Parameters, indicators, and projective devices designed to discriminate possible stages of post-attack society leading to recovery cannot be subjected to empirical tests of their validity or projective power. Any propositions about the general characteristics of post-attack society or the nature of societal recovery are similarly untestable in the present time. In attempting to define the criteria, indicators, and general nature of post-attack recovery and recovery processes in the pre-attack situation, the behavioral scientist may wish to examine the general philosophical status of the inferential process in which he is engaging and the particular propositions and tools he is deriving.

But there is more than a philosophical problem here. One of the general lessons that seems to emerge from an historical view of disaster or crisis in society is that societies incorporate the implications of the blow into their culture and social structure. The crisis may become a milestone in the history of the community or society, and forever after, images of what is "normal" in or "characteristic" of the society may shift away from memories of pre-crisis society. Especially in later generations after the immediate generations that experienced the blow, the image of pre-crisis society may cease to have relevance. If, over time, particular pre-attack or pre-crisis states of society are less and less relevant to survivors who have retained basic elements of the culture and social structure of that society, then it may be naively restrictive to make conceptions and indicators of post-attack recovery too precisely dependent on measures and propositions derived from pre-attack social states.

Here, greater sophistication about the meaning of social change and change agents in society is needed. How is a massive disaster like, unlike, other instruments of change in society? Can massive disaster be conceived in a framework which will enable the analyst to understand its general characteristics as an agent of social change?

(c) Research Questions:

What are the social conditions--and the quantitative and qualitative indices of these conditions--for societal recovery? What are the theoretical assumptions and limitations behind an integrated set of recovery parameters utilizing data from the contemporary behavioral sciences? To what extent is "recovery" a stable state of affairs in society? To what extent is the achievement of this state of affairs limited to establishing the institutional prerequisites for implementing societal values on the level of individual behavior? How can these institutional prerequisites be defined/measured? What are the discernible and measurable phases through which a rebuilding society moves toward recovery? How can these phases be defined in terms utilizable by planners who wish to guide a process of cumulative recovery?

(4) Range of Behavior to be Studied:

The key data for deriving possible parameters of societal recovery will be data on recoveries which industrial societies have made from periods of sharp dislocation in their institutional structures. The dislocations to be studied will be confined to internally and externally induced dislocations in Western societies of the modern era. Examples of internal dislocations include calamitous economic fluctuations, such as panic inflations and depressions. While these dislocations may have their ultimate roots in foreign relations of nations, they may be profitably viewed as contained for analytic purposes within the boundaries of the society. Examples of external dislocations include major wars, especially where there has been massive destruction. Widespread natural disasters will also provide data; in certain ways, extensive natural disasters will provide situations analogous to massive attack. Electoral data in periods of extended political crisis, demographic data on population movement within society, and data on shifting proportions of members in dominant societal organizations such as large government bureaucracies, collectives, corporations, the military, and the educational and sacred spheres will be compared for trends, which seem responsive to societal institutional dislocation and recovery. Shifting amounts of resources available in the private sector versus the public sector of the economy and the polity should be computed over periods of institutional dislocation, to determine pressures on the allocation of human and physical resources. Interdisciplinary capability among the following specialties will be required for this study: sociology, economics, political science, legal studies, history, social psychology.

(5) Areas of Application of Findings to Civil Defense Programs and Countermeasures:

The findings of this study will be parameters and indicators, together with supporting theory and data as required, of recovery in its varying time phases after attack. These findings will be used as explicit goals for the development of countermeasures and policy. In addition, they will serve as criteria against which any policy or countermeasure can be evaluated.

Study 2.1

POST-ATTACK DEMOGRAPHY

(1) Subject for Research: Prediction and evaluation of changes in variables describing characteristics of the whole American population, for the purpose of estimating population processes in several post-attack phases

(2) Requirement for Study:

As a fundamental capability in planning for civil defense counter-measures, a way must exist for describing the effects which massive attack might have upon the population characteristics and processes of the United States. From this capability will come criteria for estimating the critical problems which will arise as the population becomes the manpower pool for the total societal recovery effort. The development of demographic tools through which post-attack demography can be described and projected will make it possible to accomplish at least two important things during pre-attack planning. First, descriptions of the kinds and ranges of alterations in population characteristics as a result of attack will enable the planner to estimate the kinds of societal manpower resources available in the population for conducting recovery tasks. This description of population characteristics following attack may entail the development of new demographic tools and the extension of old ones, particularly in the direction of relating demographic analysis to social and cultural process. Secondly, methods of describing the ways in which varying population characteristics may shift and thereby indicate dangerous long-term population processes (e.g., a drastic decline in the birth rate) will enable the planner to direct his thinking

to those critical social institutions in need of protection and counter-measures against attack effects. Demographic tools should point to the ways in which vast imbalances, within population generations and across generations, can disrupt the reproduction of the population. Here, one final goal of this research must be to construct guideline estimates of the desirable population characteristics which counter-measure systems should seek to bring about or maintain.

(3) Objective of Study:

(a) Central Research Topic:

Through the application of existing methods of demographic analysis and the development of required new methods, this research should project and describe the population characteristics and population recovery resources of American society following massive attack. Means of constructing an inventory of population demographic characteristics and resources should be developed which will enable the civil defense planner to make population resource assessments and inventories at varying levels of generality and under varying pressures of time. Building upon these techniques for making this kind of demographic assessment of post-attack American society, the researcher should then explore the capabilities and limits of these techniques for projecting significant post-attack social and cultural processes in the American population. The goal here should be to use demographic analysis to project and explore the significant post-attack social and cultural processes about which the civil defense planner must be concerned in making his assessment of the requirements for restoring a viable American population and social system.

(b) Background of Study:

Systems of human behavior are targets for attack and disruption on several levels. The largest and most fundamental human group which is vulnerable to attack is a population. The population is the self-generating group of human beings which provides the individual human member inputs into processes of maintaining a society. As the fundamental group for providing continuity of the human species, the population can be described in ways which are characteristic of it. For example, what is the rate at which a population reproduces itself and grows? What resources for what kinds of adaptive skills are available within the population, as measured by the many differences in aptitude, skill, and background available within it? What is the distribution of the sexes geographically and by age? What are the numbers of people in different significant age groups? What is the normal rate of death, and for what groups? How rapidly are old people becoming a significant group? Considering the young and the old in the population, what changes in dependency ratios are occurring in the population? From such questions, it is possible to construct particular quantitative indicators which describe the population and which indicate the rates at which the population varies its old characteristics and acquires new characteristics.

There are many ways in which massive attack could disrupt a population and cause a radical change in its characteristics. Today in Western Europe, the loss of significant numbers of males in the generations which fought World Wars I and II has affected not only the availability of manpower to carry on vital functions, but the very ability of many women to find legal husbands. In the contemporary United States, a complex new medical speciality, geriatrics, is arising, to meet the medical-social problems caused by a sharp increase in the number of old persons. Changing settlement and life patterns of these old persons are causing the emergence of new forms of community organization, and pressures for increased economic opportunities for the aged. In the event of a massive attack against the United States, there may be sudden changes in the characteristics of the American population. This will depend on attack targeting and longer range attack effects, but a wide variety of sudden changes in population characteristics may occur. A massive attack against central urban areas during working hours may sharply limit the post-attack availability of middle-aged professionals and managers, skilled laborers, and white collar workers. Because of contemporary movements of the aged to arid and open geographical

areas which are also becoming locations of hardened missile sites, attacks against these sites might have the peculiar and, at present, unexpected effect of removing large numbers of the retired and aged from regional demographic patterns.

Humans, as the fundamental constituent units of a society, form a population spread over space. But a human population as a system of behavior does not result merely from adding up a number of individual human beings into an aggregate. A population exists as a social system only when its human members interact and form a self-perpetuating aggregate. A human population exhibits characteristic qualities which can be expressed as measures and indicators of its processes. Individual humans grow older and die, while new humans are born. Thus, within a population, generations emerge. While generations are partly defined through the perceptions of their members (witness the "Lost Generation" as a term applied to intellectuals reacting to the 1920's), and while any generation must be defined relative to other generations, the term generation always refers back to the simple fact that at any given time in a population, there are groups of people who share roughly the same age, and groups who do not share this age. Extending somewhat a term which is in increasing use among demographers, it may be said that a population can be stratified into "cohorts". There is always a generation of the young, who are not ready for child-bearing. There is a generation of the fertile and the child-rearing, made up of individuals who are the principal supporters and developers of the many facets of their cultural system and the maintainers of their population. There is a generation of the old, who are not bringing new life into the population, and whose impact, in the American value system, on the culture and participation in varied social roles declines as the years pass.

There are several fundamental biological determinants of demographic characteristics. In addition to the distinction according to sex, people have individual chronological ages when viewed as individuals. Age, as a variable characteristic of a population of people, can be used to rank and compare--to stratify--sub-groups of the population. There are other characteristics which can be used to view both people and populations to which they belong. Individuals have occupations and areas of residence. In the aggregate, these characteristics tell the planner and observer much about the kinds of resources within a population for carrying out its processes of self-maintenance. Within the child-bearing generation, the availability of individuals of both sexes for reproduction processes, as influenced by the social division and allocation

of labor, forms the basis for a fertility rate for the whole population. From this rate, an assessment of the rapidity and quality of population growth and decline can be made.

Characteristics which can be used to describe whole populations and compare population sub-sectors against each other are demographic characteristics. For the purposes of this research, demographic studies should be sharply distinguished from ecological studies. The scientific specialty of ecology is the study of the relations between populations and their environments. Ecology examines the forms and processes of populations, as they result from the play of environmental constraints. Central to ecological studies is a concept of balance--a state of short-term or long-run equilibrium between population and environment. Ecological balance is achieved when the processes which maintain a population from generation to generation fall into a self-maintaining pattern as a result of at least a minimum adjustment to the continuing stimuli imposed by the environment. While it can be expected that attack effects will have a high probability of upsetting ecological balances within the population, the focus of the present study upon demography, instead of upon demography within a larger ecological framework, is useful in its own right.

The goal of this analysis of possible post-attack demographic characteristics and processes of the American population is to project the varieties of post-attack population characteristics from pre-attack population variables and parameters. While a population cannot exist for long without a minimally favorable ecological balance, the population exhibits in its own right characteristics from which projections of later characteristics can be made. These demographic projections enable the analyst to focus on those relationships among population characteristics which are associated with changes in the structure of the population. Such changes may or may not depend upon ecological relationships--culture patterns may shift apparently independently of ecological relationships, as in the case of variations of birth rates which are associated with changes in workers' economic conditions, or with the introduction of contraceptives. Demography, as a descriptive and analytic branch of the behavioral sciences, can generate analyses of some power by emphasizing population characteristics and processes independently of varying cultural and ecological conditions. Later, after sufficient formulation of concepts which describe population characteristics and trends, it is possible to relate these demographic

concepts more clearly to cultural and ecological factors which influence the processes of maintaining a population and giving it its distinctive characteristics.

The present research must seek to apply to pre-attack data a set of analytic tools which will enable meaningful projections of post-attack demography. These analytic tools must be utilized and designed to allow for the effects of radical shifts in pre-attack social life, and the consequent implications of these shifts for the demographic characteristics of the pre-attack society. Such a shift might take place, for example, as a result of a pre-attack strategic evacuation of certain sectors of the population. One of the more sudden of these pre-attack shifts in social life would be the large inflow of persons into shelters, as part of a larger program of population shielding which could include both sheltering and strategic evacuation.

A study of post-attack population demography should explicitly include systematic examination of the demography of society which would be a result of taking shelter on a large scale. A basic proposition here would be that social processes which selectively populate shelters would produce sharp demographic shifts as a result of immediate attack effects. It may be argued additionally that mortality rates in some shelters may be significantly larger than normal projections for populations, because of the presence of fewer individuals able to engage in adaptive and adjustive skills for the whole shelter group. An analysis and projection of post-attack demography must include, therefore, means for assessing the population processes set in motion by success or lack of success of impact shielding and immediate post-attack measures. This analysis must even include such problems as would result from the long-term presence of evacuees in a relocation area under heavy post-attack stress.

While the development of the kind of demographic tools envisioned here would have parallels to the problems already attempted in the development of certain contemporary damage assessment models, this study does not duplicate that work. The present study is oriented toward the development and application of tools and projective devices which will point, first, to those population processes which are critical to the maintenance of the American population in the post-attack situation. Included in this phase of the study should be systematic statement of critical variables and indicators for describing these processes, and methods for using these factors to calculate post-attack social effects over a variety of recovery phases. From this analytic phase of the study

should come the data and conceptual guidelines for discerning which population processes are vulnerable in what ways to attack and long-term disruption. A goal of this phase of the study should be to state an entire range of vulnerable population processes in terms which will point to the kinds of social institutional vulnerabilities which can be made the subjects of countermeasure systems. It is at this point that explicit recognition must be made of the interdependence of population processes and the cultural and social systems which govern the patterns of behavior of the individuals in the population. In projecting areas where countermeasure development is needed, the analyst must be able to translate the work of descriptive and projective demography into terms which describe the social and cultural processes which influence and govern population.

(c) Research Questions:

What are the significant demographic variables and indicators which are needed to describe and project post-attack population processes? How can the impact of attack upon the processes of self-maintenance in population be conceived? What demographic characteristics of the American population are likely to shift, and in what ways? What social and cultural institutions and behavior patterns are related to these shifts? What social and cultural institutions can be the subject of countermeasure systems designed to preserve the necessary characteristics of the American population?

In summary, what are the demographic indicators of the population resources needed to withstand attack and to recover from it? What are the demographic indicators of societal recovery? What does the development of the demographic indicators and other analytic tools of this study assume about American life seen as a complex social structure and system of cultural values?

(4) Range of Behavior to be Studied:

The demographic speciality in sociology and the relevant disciplinary areas in social psychology, economics, political science, and history are among the required areas of research skill for this study.

The scope of this study requires careful selection of data from a vast array of potentially relevant data. The principal data emphasis should be on the body of systematic population census data which is becoming available for a number of contemporary complex industrial societies. These data will be available from governmental census agencies and from private or semi-official population study groups which specialize in the study of complex human populations. It may be useful to include demographic data, where available, on a few non-European societies in the process of rapid social change and industrialization. Such data may illuminate the relationships between culture and critical population characteristics, as these characteristics change in relation to the onset of industrialization.

The data utilized in this study should be examined from two perspectives.

(a) Using as a starting point the data which are now becoming available from the 1960 United States Census, an analysis of population structure and trends of the contemporary United States should be undertaken, with reference to both immediate and long-term effects of massive attack upon the demographic characteristics of the American population. This analysis should focus upon both descriptions of contemporary American population characteristics and processes, and the ways of conceptualizing the vulnerabilities of the population in its critical

survival and recovery dimensions. This means that a broad view of population process must be taken: not only should the analyst concern himself with the mere ability of the American population to reproduce itself, he should be able to develop demographic indices of the various population processes which will influence the availability of post-attack manpower, skills, motivations, and forms of social structural differentiation. The demographic indices and conceptual tools for analyzing population processes which are developed in this study should be expressed in a form which will enable their use by the civil defense planner for the purpose of estimating the effects of varying kinds of attacks upon the American population. It will be the task of the civil defense planner and not the researcher, however, to make the final attack inputs.

Even in this section, the study is already vast in scope. To begin to limit it, researchers should proceed initially from some idea of the kinds of social and cultural patterns which govern American population processes. What demographic indicators might suggest the social and cultural patterns which should be influenced in order to achieve the kinds of population resources required during a succession of post-attack recovery phases?

(b) Where comparable data exists, it may be useful to assess on a comparative basis the longitudinal changes in population characteristics occurring in a variety of societal forms. The purpose of this analysis would be to examine the demographic characteristics of societies at various levels of institutional complexity, in order to determine more clearly what may be the demographic characteristics which reflect differences among societies in societal capabilities for recovery from massive attack.

(5) Areas of Application of Findings to Civil Defense Programs and Countermeasures:

This study provides both a fundamental data and theory base for civil defense planning, and a set of concrete considerations leading to specific countermeasures.

(a) Demographic tools for assessing population resources and projecting post-attack population characteristics and requirements will be developed.

(b) Systematic means of making a demographic inventory of population recovery capabilities will be stated, leading to the definition of the critical population resources needed for societal recovery.

(c) Means for relating the demographic analysis to the social and cultural processes which control population will be developed, to point to those particular, visible, vulnerable institutional processes governing population resources and growth for which civil defense countermeasures must be designed. Feasibility estimates for attempting countermeasure programs in different institutional areas should be attempted. For example, assuming the elimination of large numbers of the child-bearing generation, how feasible is it, and in what ways is it feasible, to raise societal birth and fertility rates?

Study 2.2

POST-ATTACK MIGRATORY PRESSURES

(1) Subject for Research: Pressures toward large-scale population migrations following massive attack

(2) Requirement for Study:

One of the possible effects of a massive attack is to create conditions which have frequently led to large-scale migration. Under certain conditions, it may be desirable to inhibit migration; under other conditions, it may be desirable to facilitate it, to achieve certain desired social states. Migratory phenomena must be studied, therefore, to enable civil defense planning to anticipate and guide migratory pressures operating in large masses of people.

(3) Objective of Study:

(a) Central Research Topic:

The objective of this study is to establish the conditions, in a post-nuclear attack situation, under which migration can be expected, the conditions under which migration is desirable, and the factors which facilitate or inhibit migration. Both spontaneous and artificially induced migration should be studied.

Wars, disasters, disease, climatic variation, and political and economic changes can all affect the ecological balance between a population and its environment. Alterations in the physical and social environment have frequently been associated with movements of people away

from such situations toward new and more congenial situations. The present research should determine the ways in which massive disturbance of the physical and social environment of the United States could result in large movements within the population. The research should establish a set of variables and parameters for describing and projecting such movements, and for relating these findings to the social and environmental destruction which an attack produces. The research should lead to the development of means for managing the ecological imbalances caused by attack and for controlling pressures to migrate within a framework set by national policies.

(b) Background of Study:

While the proposed research has one theoretical focus in the concept of "ecological imbalance," it should take a broader view of ecological imbalance than the simple disruption of an equilibrium state which has built up between population and environment. "Pressures" toward migration may include the desires of individuals to restore some sense of social control in the face of the disintegration of or ineffectiveness of social institutions. Because this state of anomie may accelerate trends toward migration, a complete view of migratory pressures must use an analytic framework which takes adequate account of the ways in which structural pressures within an industrial society under stress can release individuals from normal social constraints.

It is particularly important that studies of potential migratory phenomena in post-attack society make adequate allowance for time phases after attack. The constraints imposed upon a sheltered population obviously limit possibilities for immediate post-attack migration among this group. For them, migration does not arise as a meaningful possibility until emergence and the beginnings of reconstitution and recovery efforts. For a group distant from impact, however, migratory possibilities may begin at an earlier time.

Not all migratory phenomena have resulted from environmental shift and weakening social institutions, of course; some migrations

have been deliberately induced by governments and other directing agencies to achieve particular results. Examples of such induced migrations are to be found in diverse phenomena such as the controlled in-migrations to Israel, the settlement of immigrants along the railroads of the American Northwest, and colonizations of new lands conducted by many imperial nations. It is clear, however, that many if not all of these controlled migrations would have been unsuccessful if the high attraction possessed by the new lands had not existed in a context of frustrated opportunity, conflict, and dislocation in the old lands. Directed migrations offer an opportunity for examining the various institutional forms which can be imposed upon a population of individuals mobilizable for migration.

Research on migratory phenomena should develop, at the outset, careful distinctions among levels and kinds of large group movements. It may be useful for the researcher to attempt a typology of migratory phenomena, in which he carefully distinguishes migrations caused by various forms of short-run and long-term crisis: wars, including refugee flights and displaced person movements; political and economic changes; disease; climatic shift; seasonal changes (stimuli to movements of agricultural migrant laborers and nomadic peoples). An attempt might be made to indicate contrasts in degree of internal organization in a variety of migratory phenomena, and the characteristic qualities and parameters of different forms of migration. Such a typology would be directly useful in placing possible forms of post-attack migration in American society in a framework which shows the relation of these possible phenomena to recurring migratory dynamics and pressures.

(c) Research Questions:

What are the large population and ecological processes which might create pressures toward migration in post-attack American society? How is migration a result of shifting ecological balances and large, population-wide structural processes? How are these large-scale processes translated into pressures which create individual and group perceptions and motivations leading to migration? What are the geographical and economic pre-conditions of migration, in a

widespread situation of devastation, which planners must consider if a policy of encouraging or instituting migrations were to be included in post-attack recovery countermeasure systems? From this perspective, how can pressures toward migration be considered an outcome of pre-attack strategic evacuation? How do pre-attack evacuation experiences or projections suggest the utilities of post-attack migration, and the situations which may trigger post-attack migration? To what extent is migration adaptive or maladaptive as a pattern of response to attack? What are the ideological and logistical requirements of administrative arrangements required for controlling, directing, and sometimes stimulating migration?

On the basis of existing data, when do migrations begin? What are variations in their organization, scope, and ultimate social utility? What scientific systematization of migratory phenomena can be made to illuminate possible post-attack migratory phenomena?

Can migratory pressures or phenomena be controlled? What will be the capabilities and limits of formal and informal control mechanisms on migratory phenomena in post-attack society?

(4) Range of Behavior to be Studied:

Historical, sociological, geographical, economic, and anthropological data will be central to this study. Insight gained from the social psychological analysis of group movements of people should provide part of the analytic frame for the data.

Historical and contemporary demographic and census data which indicate patterns of shifting population structure should be used to

establish the demographic and ecological correlates of sudden shifts in the spatial location of populations, and the further processes of movement and strain which result from these shifts. Data on population movements which are associated with non-wartime economic, social, or environmental conditions should be included, as well as data on wartime and immediately post-war populations. Specific regional studies of the ecology and demography of such areas as Northern France after World War I, Germany and Central Europe during the era of the Displaced Person in and after World War II, strategic bombing areas in World War II Japan, and earlier historical examples such as the migratory patterns during the development of a money economy in Renaissance Europe and in the Thirty Years War period represent some of the variety of data to be considered relevant.

Account should be taken of the variety of short-run and long-term migratory behavior revealed by contemporary, non-wartime disaster studies, but a scheme of analysis should be developed which will carefully separate such phenomena as short-run "convergence behavior" from long-term migratory behavior.

Data analysis should include an assessment of governmental experiences with the directed migration and resettlement of large populations. Israeli data on immigration and resettlement provide an important case for special consideration. Data gathered by the Allied Powers after World War II, during the resettlement of "displaced persons", should be utilized where available.

(5) Areas of Application of Findings to Civil Defense Programs and Countermeasures:

(a) Systematic indicators of migratory pressures will be used to support guidelines for the administrative control of populations. These guidelines will be developed to take cognizance of large-scale pressures toward population movement which can be exerted in the post-attack situation.

(b) Conditions and resources for necessary in-migrations and out-migrations must be prepared in the pre-attack situation, so that when migration must be controlled, instituted, or quelled, for purposes of recovery, the population or sub-population in question can move or remain in such a way as to attain policy objectives. These conditions will require the establishment of communication, training, and resource requirements in the pre-attack period. It may be useful to assess inventories of survival items to determine whether these inventories do possess or can possess resources required to offset these ecological imbalances which lead to migration or which make existence acutely difficult for sub-populations.

(c) A specific administrative structure may be required to channel migration to new areas, or to provide the focus for legitimizing staying in an area, where individuals and groups subjectively define their immediate situations as requiring movement away. The organizational, ideological, and logistical requirements of a "civil migration authority" might be considered, especially as these requirements might relate to other post-attack countermeasures.

Study 3.1

PSYCHOLOGICAL ATTRIBUTES FOR ADAPTATION: LEARNING AND MOTIVATIONAL REQUIREMENTS

(1) Subject for Research: Desirable or required individual psychological attributes for adaptation to the post-attack situation, with special reference to establishing the individual learning and motivational requirements for emerging into and/or facing an environment which is disordered and stressful on a large scale

(2) Requirement for Study:

Individuals have varying levels of tolerance for disorder and stress in their immediate, perceived environments. After the passing of the impact of a massive nuclear attack, and after the individuals can leave immediate situations of relative immobility and protection, large numbers of persons would be confronted with a magnitude of social and physical disorder unique in their experiences. This disorder, ambiguity, and stress may cause extreme passiveness, confusion, withdrawal or other such phenomena in many individuals.

The civil defense planner needs to know the minimum requirements which would enable individuals to learn to begin and to desire to cope with beginning the work of recovery amid great disorder. The planner must know what knowledges, motives, procedures, institutional arrangements and organizational capabilities are required to teach individuals to adapt effectively to widespread destruction. This will be especially true in the cases of those large numbers of individuals who

may be sheltered from attack, and who must emerge in order to begin rebuilding. When equipped with the relevant learning and motivational requirements for successful post-attack coping with stressful environments, the planner can, in the pre-attack situation, prepare programs, plans, and organizations for undertaking the pre-attack and post-attack training of individuals' capacities for adaptation to disorder.

(3) Objective of Study:

This research should seek to determine the kinds and ranges of learning and motivation which individuals must have in order to adapt successfully to the disordered and stressful social and physical world of a post-attack situation. From this assessment, a set of learning and motivational requirements to guide civil defense plans should be generated. The research should consider not only possible stress resulting from initial emergence from shelter by large numbers of people but the more general problem of equipping large numbers of people to cope with continuing and extensive disorder in their immediate environments.

The research should begin with a range of post-attack environments which can occur, and endeavor to apply data and theory from psychology and social psychology in order to formulate general hypotheses about the behavior of people in these situations.

(4) Research Questions:

What does current knowledge in psychology and the sociology of small groups indicate about the varying capacities of individuals to resolve ambiguous, disordered, and stressful environments? What, in

particular, is the relation between such studies as studies of authoritarian and non-authoritarian tolerance for ambiguity and studies of sensory deprivation, on the one hand, and projections of social conditions in the post-attack situation, on the other hand? What old learnings and motivations can be reinforced or activated to enable individuals to cope with emerging into the recovery environment? What new learnings and motivations are required? How can these learnings and motivations be stimulated, elicited, inculcated during the pre-attack, impact, and post-attack phases? What are the organizational requirements for supporting and developing required learnings and motivations? In what sense can the civil defense administrator manipulate the post-attack environment to make it less disordered, ambiguous and stressful? What will be required to guide individuals toward adaptive, constructive behaviors when the possibility of manipulating the environment has been exhausted, and when individuals have reached optimum learning and motivation for adaptation?

(5) Scope of Research:

It is recognized that only a beginning can be made on the proposed research for the level of effort available. It is also obvious that an experimental approach is inappropriate to the problem in its present formulation. What appears to be most useful at this stage is to organize the available information on this problem and to attempt to apply it in particular post-attack situations. Once this initial effort is accomplished (the objective of the proposed study), it may then be feasible to initiate experimental studies related to particular hypotheses which have been generated about human behavior in these highly stressful environments.

Study 3.2

PERSISTENCE OF DEBILITATING FEAR

(1) Subject for Research: Determining the kinds and ranges of enduring and debilitating fear reactions to massive attack, as expressed in both individual and group reactions, for various times following attack impact, and assessing available means for managing these reactions

(2) Requirement for Study:

Mere knowledge of the fact of massive attack can conceivably be a vastly terrifying fantasy or reality to many individuals. The actual effects of attack create an even wider potential range of fear responses in the population. Some of these fear reactions may have adaptive consequences for individuals, but others may require explicit management if individuals and groups are to cope with terrifying or anxiety-arousing environments or memories. Existing evidence suggests that harmful fear reactions to massive devastation or deprivation may be expressed through several quite different outlets, through varying time phases following the initial devastation. For the individual, attack may trigger maladaptive behavior such as random flight or withdrawal, or it may unleash alarming fantasies which immobilize him. In the group setting, fear may be expressed in group panic behavior; in rigid, overly conforming responses of members over a period of time; in the formation of sub-cultures which, in their attempts to exclude threatening stimuli, block larger adaptive efforts and programs.

The civil defense planner must know the variety and ranges of fear reactions which may impede individual and group adaptations to massive attack. At the same time, he needs to know, through systematic research, whether the anticipated effects of fear may be of far less consequence than some predictions and pre-attack fantasies would indicate. This may, in fact, be the case.

If fear is a problem following attack, the civil defense planner must be prepared to cope with the full range of possible responses. He must be prepared for highly reactive fear responses immediately following attack, and for more subtle anxieties which impede optimum participation in recovery efforts later in time, as reconstitution efforts begin. He must know the extent to which individuals and groups are capable of self-induced compensating behavior which mediates and controls fear, and the extent to which external agencies and mechanisms must be employed to manage and redirect fear.

Fundamentally, the civil defense planner requires a differentiated conception of "fear" and "possible fear reactions". This will replace possible fantasies about fear reactions (which now may influence the planner's thinking) with concepts and parameters which will define the total span of possible fear reactions to attack, and which permit the coherent projection of possible evolving forms of debilitating fear reactions. This conception should enable him to estimate, at the outset of his planning, the extent to which persisting and debilitating fear will be, in fact, an individual and group management problem. It should then enable him to identify crucial problems and mechanisms of fear management, and to outline feasible means of controlling fear.

(3) Objective of Study:

The results of this research should provide an estimate of the extent to which debilitating and persisting fear will occur after massive attack, and the extent to which existing personal and group mechanisms for its control will require reinforcement by outside mechanisms and plans, in order to achieve societal objectives of survival and recovery. The research should distinguish among the types of possible fear reactions which may result from massive attack, and their locus and probability of incidence for successive stages of societal recovery.

The research should not focus on cognitive and motivational requirements for making initial emergence from shock or shelter and initial adaptation to attack effects, except as these requirements specifically pertain to the control of fear or acute anxiety. It is recognized, of course, that the distinction here will not always be clear. Nevertheless, this research should focus on fear as part of individual and group psychological climates at all phases of survival, adaptation, and recovery.

Fear is taken here as a crucial manifestation of stress, and as a manifestation which may occur in varying forms at varying times. This research should equip the planner to discriminate among the forms of fear and to estimate the feasible mechanisms for enhancing and instituting controls over this form of stress.

(4) Research Questions:

What forms of individual and group fear reactions will occur, at what phases, after massive attack? Up to what points is fear an adaptive, non-pathologically motivating response to attack and post-attack

societal disarray? What are the indicators and parameters of maladaptive, persisting, debilitating fear?

How will individual forms of fear arise independently of group contexts and settings? What are the pre-attack indicators of individuals and groups that will be more vulnerable, less vulnerable, to fear during and after attack? To what extent do group settings reinforce, control, mediate fear reactions in individuals? In particular, how do group structures and sub-cultures mediate such different possible reactions as panic and withdrawal from reality? To what extent, when, and under what conditions does fear result in overt behavioral manifestations, as opposed to passive behavioral constriction? What is the role of such highly personalized processes as fantasy in leading to overt behavior, whether random or organized, in contrast to a more passive, adaptive or maladaptive address to the environment following attack? How do fantasies, in individuals or sub-cultures, arise to mediate the experience of fear? What are the inter-personal, inter-group processes of communication and information flow in creating or dampening fear?

What kinds of civil defense countermeasure programs and systems are likely to be fear-arousing, fear-enhancing, fear-reducing, at the various phases of the post-attack situation? (Note: while the secondary analysis of public opinion data may be of use here, no primary surveys of public opinion should be undertaken in this pilot study.) How will fears related to civil defense countermeasures in the post-attack situation be manifested, and what will be their range?

To what extent does fear, in its varying forms, represent a set of specific targets for control in the post-attack situation, as opposed

to being an ingredient of other, more controllable psycho-social reactions? What resources which may exist in the pre-attack situation in individuals, groups, and the general culture will be, can be, mobilized in the post-attack situation to control fear? What are the feasible kinds of new control mechanisms?

Study 4.1

ROLE STRUCTURE AND REWARD- STATUS SYSTEM

(1) Subject for Research: The predicted societal role structure and role requirements in post-attack society, with special reference to the occupational structure and the reward-status allocation system

(2) Requirement for Study:

A society-wide survival and recovery effort will require the optimum use of the critical skills to be found in the structure of social roles through which the society organizes the efforts and skills of individuals. To plan for this optimum use of available skills and roles, the planner must be able to project the total role structure which will exist in society under varying conditions, and to assess the kinds of competing social demands which will be made upon occupants of critical classes of roles. To understand the complex role structure of an industrial society--as it ramifies through a variety of occupational, familial, citizenship, and voluntary roles--is to understand the structure which integrates individual patterns of performance and expectation into a system of performances based upon the assignments of rewards and statuses. Through comprehending the functioning of this structure of roles, the planner can anticipate the kinds of critical roles which will be needed in post-attack society. By relating these roles to the pre-attack role structure, he can be prepared to counter, when required, enduring and sometimes maladaptive patterns in role recruitment and in the assignment of rewards and statuses.

(3) Objective of Study:

The objective of this research is to describe the structure and functioning of the various forms of likely role structure in post-attack American society, for the purpose of determining the factors which will govern recruitment and assignment to critical roles. Kinds and locations of critical roles and role behaviors and skills should be established. Pressures caused by the workings of the total social system of assigning rewards and statuses to roles should be analyzed, as they interfere with or enhance recruitment to, training in, and acceptance of roles which are critical for survival and recovery.

(a) Central Research Topic:

Social roles form the link between individual patterns of behavior and the social system. A role consists of a stable set of behaviors by an individual--together with complementary and stable expectations about this behavior shared by others--characteristic of a given position within a social structure. As an integrated aggregate in the whole society, roles form a structure through which the many formalized and informal tasks of social living are conducted, and through which the social division of labor is perpetuated. This division of labor is a principal form of basic social organization through which the many kinds of work in society result in supporting the functional processes of society.

A massive attack on the basic structure of society can be expected to disrupt the performance of behavior in many social roles. This disruption could occur in many ways, but among the more likely forms of disruption are direct removal of occupants of particular roles through killing, direct interference with role behaviors through competing demands of other roles on surviving critical personnel, and a variety of

indirect forms of interference which involve disrupting the environments and communication processes necessary to the best performance of role behaviors. Since societal functioning depends not only on individual patterns of action but also on a structure which links together all social roles into a complex network, large scale disruption of individual role performances will affect the capacity of the whole structure to perform critical functions.

The present research should analyze the likely forms of disruption which massive attack would cause in the basic role structure through which necessary functions for the whole society are performed. The start of this study will be an analysis of the structure of occupational roles in American society, and the effects which attack and recovery demands would have upon patterns of role performance, role recruitment, and rewards given to performances of occupational roles. There are a number of other critical classes and sub-classes of role in the total societal structure, however, even though occupational roles are most frequently used to label society-wide patterns of role activity in America.

The research should develop a functional description of other roles which, while not bread-winning roles for the incumbent, may be critically important in the maintenance of society. These other broad classes of role in the total role structure should then be related to the total role requirements for survival and recovery, so that the total resources of the post-attack role structure can be utilized to guide individuals toward the performance of critical functional roles.

(b) Background of Study:

The concept of structure of roles utilized here derives from a larger view which treats industrial society as a social system composed of an integrated but highly differentiated set of functional sub-units. While this viewpoint is most characteristic of contemporary "functional theory" in sociology, it does not depend upon this school of sociological thought for its power in the present research situation. What is needed is some conceptual tool for analyzing the kinds of structured forms of interdependent behavior which form an empirically discernible pattern of integrated social action, beyond the level of the individual participant in social action. The concepts of "role" and "role structure" aid in pointing to the ways in which society manifests the visible patterns of a division of labor according to its several critical functions.

Roles are conceived here as having greater or lesser strategicity within a total social structure. These roles may occur in many social positions, within many different sectors of individual human activity. Occupational roles are perhaps the most important class of roles in an industrial social structure, where relatively great emphasis is placed in the institutional life upon separation of the roles attending principal life functions. Through an occupational or equivalent role, the individual makes his principal input into a system of human performances which supports group and societal goals. From his occupational or equivalent role, the individual draws his principal means of economic support and social status. This is especially true in American society, with its system which emphasizes status achievement rather than status ascription. Yet even in the American society, with its relatively high degree of social mobility based upon acquiring the essential qualifications and behaviors of an occupational role, the individual participates in a variety of non-occupational roles over which he may have varying amounts of control. Roles such as citizen, associational member, informal group member, and family member have characteristic patterns of behavior, and for many population sub-groups, participation in these non-occupational roles becomes an indicator of the general status which an individual enjoys in the whole social system. These non-occupational roles may limit the freedom of an individual to participate in occupational roles, or they may reflect a larger style of life which characteristically defines the kinds of roles in which an individual can participate.

This study of the projected and required post-attack role structure in American society should begin with the development of a language and conceptual structure for describing the principal classes and sub-categories of functional roles in the American role structure. Criteria, based ultimately upon a systematic theoretical conception of American social process and to be used for assessing the degree of functional strategicity of the many roles within this central functional role structure, should be generated within this analytic scheme, so that a projection can be made of (a) the kinds of roles and specific roles which will be critical to societal survival and recovery in their various phases; (b) the degree to which various critical roles and role sectors within the role structure are vulnerable to massive attack.

Special care should be taken to develop an economical but general way of describing the various kinds and locations of occupational roles in American society. A substantial body of work in the sociological specialty fields of social stratification analysis and the "sociology of work" will be relevant. The method for describing occupational roles across a broad range should include within it means for measuring the capabilities of various role incumbents (as measured by the skills and background necessary for them to assume the given role in question) for transferring from one occupational role to another. In mobilizing, organizing, and conserving possibly scarce reserves of individuals capable of participating in several critical roles, it is of paramount importance to know the maximum capacity of an individual for new role behavior, as measured by a total assessment of his capabilities in his previous role.

A full analysis of the critical role structure required for post-attack survival and recovery will range across both occupational and non-occupational roles, employing analytic devices and parameters which enable the definition and weighting for criticality of several roles which may cluster in one individual. Here it may be useful to attempt to specify for classes and categories of individuals the kind of role which should take precedence in the post-attack situation, and the kinds of recovery skills which might inhere in the individual as a result of his several roles. Assume, for example, that a skilled machinist is also a high officer in a lodge or other fraternal organization. The skills of a machinist would be critical in repairing physical destruction. But the capability for leadership in a voluntary associational setting may suggest that this particular machinist is more critical for recovery in his

role as organizer and leader of semi-official patterns of group life. What kinds of role combinations such as this one exist? How can they be analyzed against a society-wide set of social survival and recovery requirements, through time phases after attack?

This research study must proceed from an explicit analysis of the ways in which the role structure of society may shift in composition as response to society-wide functional needs for maintaining the total social structure. It must at the same time allow for the freedoms and ambiguities built into the American value system. The American role structure emphasizes maximum freedom from individual constraint and compulsion, and maximum opportunity to achieve more desirable statuses, even when such opportunity may be, *de facto*, closed to certain categories of individuals. In the post-attack situation, it is conceivable that certain critically important roles or role skills may be required over a long term, and that individuals at the same time will be unwilling to remain in these roles for long periods because of the low status of these rewards and skills. Or, an individual may resist transferring his personal labor commitment from his pre-attack role to one of equivalent status in the post-attack situation. If these and similar tensions between societal role requirements and individual capacities and participation in roles occur, a fundamental problem of labor management and human resource allocation arises. This research must show in the end how the highly differentiated and relatively open American role and status system may respond to tensions induced by post-attack survival and recovery requirements, and how the different claims in this conflict may be evaluated and managed. This is not a problem of managing role conflict in individuals, where several roles may have competing salience for the incumbent in a situation where the incumbent can perform only one role. Rather, the conflict here is between the role requirements of the society and the individual's possibly diverging commitment to a personally satisfying role. To manage this conflict, a clear assessment of the whole society's role requirements is needed, within which individuals' claims to exercise their roles can be evaluated.

(c) Research Questions:

What are the role requirements for survival and recovery? How can the contemporary American role structure be analyzed and evaluated against criteria of societal recovery and recovery requirements, to

enable the analyst to discriminate what are the more critical and less critical roles and classes of roles for recovery? What model of the American role structure and social system is required to describe and evaluate critical role requirements for recovery? What are the indicators of the various critical roles in which one individual might engage? How can priorities for performance be assigned to individuals capable of several roles? How can individuals be induced or trained to shift roles? What general classes of skill may be transferable from role to role? To what extent may the pre-attack system for allocating roles, rewards, and statuses in American society enhance, hinder, influence survival and recovery capabilities? Must the reward-status system be modified toward new patterns of recruitment to critical roles?

(4) Range of Behavior to be Studied:

This research study derives principally from sociology. This focus gives almost equal weight to theoretical and empirical-investigative sociology, although the ultimate product of the study must be to provide the civil defense planner with a scheme of categories and criteria which will enable him to make specific decisions regarding the structure of the post-attack role system.

The principal research task will be an accurate description and projection of the major classes of functional roles within the post-attack role structure. This requires an extensive analysis of existing data within those specialty fields of the behavioral sciences and organizations which gather data on the American system of social stratification, and on work and life patterns. Economic data on income patterns and social psychological data on levels of capability for participating in social roles

are important to defining "critical role" in this study, but the primary data will be such data as census data and employment data, treated from a sociological perspective.

The broad range of this study will tempt the investigator to make a total survey of American social structure. It will better serve the requirements of this study, however, if a systematic development of categories of role is undertaken in the framework of a model which (a) depicts the broad role requirements for a functioning industrial society; and (b) utilizes the particular, specified survival and recovery objectives which contemporary civil defense must use to define minimum requirements of adaptation to particular forms of massive attack. The use of sociological, economic, and social psychological data should point to those critical classes of role, together with the critical characteristics of the total role structure, which will permit the survival and restoration of a total social system.

(5) Areas of Application of Findings to Civil Defense Programs and Countermeasures:

(a) Identified classes of critical occupational and non-occupational roles will be provided in a form which can be included in the basic guidelines and criteria for evaluating pre-attack and post-attack labor resources for survival and recovery.

(b) Indicators of system malfunction and individual stress within the total structure of critical roles will derive from the assessment of the capabilities of the pre-attack American role structure for making adaptive post-attack responses. Principles and organizational procedures

for adjusting the pre-attack social system of role, reward, and status allocation to post-attack recovery requirements should be outlined.

(c) This, together with the guidelines stated in (a), should provide the planner with a capability for generating: administrative procedures for managing post-attack assignment to critical roles, messages which legitimize and limit the officially necessary intervention in the process of recruiting individuals to critically important post-attack roles, and methods of training individuals and translating skills or more general role-orientation to new post-attack roles.

Study 4.4

EXTREMIST COLLECTIVE BEHAVIOR AND MOVEMENTS

(1) Subject for Research: Extremist collective behavior as possible response to and symptom of post-attack social conditions, with special reference to political movements

(2) Requirement for Study:

An important goal of societal recovery will be the restoration or reinvocation of the assumptions and procedures of democratic politics. This is because recovery is, in the broadest sense, restoring to full operation the values that are implanted in social dynamics and individuals' motives. To create the conditions for restoring democratic political life is to point American society again toward living its fundamental values. This is true whether the democratic political life is seen as instituted in a formal structure of government or in the informal, associational levels through which men learn the roles of citizenship and social responsibility in their immediate communities. To study the possible ways in which democratic politics and social life may dissolve, under stress, into extremism is to know more about how to preserve the conditions of democracy. Research is therefore required to assess the extent to which American society will be vulnerable in the post-attack situation to extremist social and political movements which would destroy its values.

Extremist responses to societal disorder by organized groups, crowds, and mobs may begin as early as the Shock and Shelter Phase,

when pressures of stress and close living may reduce interpersonal tolerance and breed aggression in need of discharge. It is in the time of initial social reconstitution after emergence from shock and shelter, however, that extremist responses to stress in society may be most important for the civil defense planner and administrator concerned with the extent to which individuals will once again be able to resume the ambiguities of increasing self-government. This research study should equip the planner and administrator with a knowledge of the likely kinds of extremist collective behavior, whether "organized" or of the relatively transitory "crowd" or "mob" types, which he can expect to encounter at various times following massive attack, together with an assessment of the impact of this behavior on democratic social and political institutions. The limits within which this behavior may be seen as normal and, indeed, a beneficial release, for various post-attack time phases should be suggested, as part of the guidelines which emerge from this research for controlling or utilizing extremist behavior in post-attack society.

(3) Objective of Study:

(a) Central Research Topic:

An extremist group advocates a program, or general point of view toward the world, which it proposes to have accepted through means which depart from the normal social and political institutions through which social policies and social change become established. This program may be based on a definition of reality which sharply diverges from accepted ideologies or views of the world, or it may claim to be a truer representation of these accepted views. At least

some of the membership are highly self-aware of the fact that their views of the world and their means of achieving acceptance of these views may depart from legitimate and widely accepted institutions. Some may openly display this, but some groups may try to hide the full meaning of their programs. This attempt to be covert is especially characteristic of the organizers of "front" groups, whose self-aware members may attempt to influence not only an unsuspecting citizenry but also a naive sector of the group membership. Extremist groups may contrast sharply in their organizational techniques and goals. One type of religious extremist group might, for example, be engaged in propounding a fantasy eschatology which requires withdrawal from all "worldly" things. Another group, with a political orientation, might be militantly revolutionary and activist in the present world, and bent upon seizing political power by overturning existing institutions through direct intervention. All extremist groups, whatever their views of the world, particular programs, and organizations, test the existing legitimate order.

Democratic political systems are subject to special pressures from extremist groups. This results from the explicit tolerance which a democracy grants to many varieties of political expression, and to the frequent hesitancy with which a democracy limits discussion of political and social issues. This research will be, therefore, not only an assessment of the extent to which post-attack American society is vulnerable to extremism. It should also provide systematic means of assessing democratic political institutions and their preconditions during societal recovery. These analytic tools will suggest particular pre-attack and post-attack countermeasures to safeguard American values as implemented through democratic politics. They should help

the planner to discriminate between the short-run and transitory extremist response and the long-term generation of extremist response which may result in enduring erosion of the democratic political process.

In a democracy, the rise of extremism may be only a passing sign of healthy debate. Yet, if extremism persists, extremism may test the fundamental resilience of a democratic order. Conceivably, extremism in post-attack society may be an indication that democratic debate is being restored. Or, extremism in recovery may suggest a decay of the political process. By examining the conditions which have led to extremism in democratic society, this research will focus on the conditions for restoring and preserving democracy in American society. As a result, the research will also clarify the meaning of "post-attack recovery."

(b) Background of Study:

Immediately after massive attack, the normal forms of political life in democratic society may sharply diminish in effectiveness and importance. Mere survival will require decisive and highly centralized control of human behavior. Organizational forms required for survival, such as shelters and evacuation-relocation centers, may imply temporary compromises of democratic procedures--sometimes in the name of a democracy which is to be reinstituted in an indefinite future. If this is a true picture of the immediate post-attack situation, customary political debate will be secondary in importance to implementing pre-existing survival plans through relatively highly disciplined means.

While bare, immediate human survival may require that wide departures from normal democratic procedures and political processes be tolerated, long-term societal recovery will be defined in part by an attempt to reinstitute the democratic processes of the civil polity. It seems to be a reasonable assumption that the basic intellectual capacities of citizens to engage in a democratic political life will, in some

measure, survive the traumas of attack and immediate impact and post-attack survival procedures. There should be some survival of learnings and experiences in democratic group life and citizenship, even if only in the relatively high amount of democratic imagery which leaders in crisis may find it necessary to use to legitimize their actions. Organized behavior in the immediate post-attack situation can be expected to provide some outlet for the practices of deeply held assumptions about the democratic government of group life.

But, during later periods of reconstruction and recovery, when the restoration of democratic government becomes an explicit goal, the assumptions of democracy may not operate with full power. New factions and remnants of old political parties can be expected to attempt to influence social policy within a rebuilding democratic framework, but the social arrangements which stabilize and moderate American politics may have been fundamentally weakened during and after attack. The highly developed associational life of American politics may be shattered or severely hampered. A general sense of loss of control over events in life, coupled with the realities of economic and material devastation, may intensify a sense of the inadequacies of normal American political processes, as these processes organize action for coping with rebuilding from widespread ruin. Large movements of people may result in the influx of large numbers of relatively rootless individuals into strange areas. In at least two ways, this could weaken the effectiveness of whatever survived of the organizations, institutions, and general consensus of the community experiencing such influxes. First, the mere strain of large numbers would hinder efforts at communicating the local culture to the new residents. Secondly, rootlessness in the new community could result in a failure by the newcomers to attend to the local ways in which democratic processes function.

These are examples of the ways in which the many levels of consensus, institutionalized compromise, and voluntary participation in the polity may be affected by massive attack. American society and other Western societies have experienced social pressures and dislocations which have resulted in a lessening of the effectiveness of democratic politics. Extreme examples of this exist in the rise of Communist Russia and in the Germany of the 1920's and 1930's. Yet extremist political movements with less devastating long-term effects have arisen from time to time in the United States. Would the conditions of post-attack American society be so difficult for the democratic politics of

moderation and compromise that large groups of alienated individuals would support anti-democratic extremist movements which promised easy-to-accept definitions and programs for reality?

The fundamental hypotheses of this study will be: (a) that extremist appeals become especially attractive during periods of societal crisis and disorganization; (b) that extremist organizations find more scope for effective action in situations of social crisis and disorganization. These hypotheses reflect the convergence of several relevant levels of analysis within the behavioral sciences. The traditional Marxist analysis of society emphasizes the importance of economic position in defining individuals' perceptions of class interest. While the economic determinism and the dialectical processes of the classical Marxist tradition are generally rejected or questioned by Western sociologists, the particular Marxist emphasis on the pressure of social situation in defining the structure of individual perception and social motivation has been instrumental in sensitizing behavioral scientists to the general role of the social structure in defining individual action and in setting groups in conflict. Durkheim's analysis of anomie complemented the Marxist insight, by suggesting a general condition in which social structure undergoing periods of abrupt dislocation may be seen as having a diminished power to constrain individual behavior. Freud explicitly outlined a process through which social norms were imposed upon the developing individual, who was already impelled by inner forces in tense balance with the external world.

Such analyses of the individual in society point to the tight but shifting dependence of the individual and his organized behavior upon group life. Studies of extremist movements in industrial society have been especially preoccupied with marking out the nature of this dependency and inquiring into the conditions under which the complex balance and discipline which controls individuals' political behavior is disrupted, releasing relatively uncontrolled forces. In varying degrees, these studies have represented an attempt to describe the ways in which structural differentiation in complex society mediates and guides political behavior. On the level of examining individual motives, a principal implicit research question has been, "In industrial society, what personality needs have been satisfied by mass movements or extremist movements?" On the level of examining processes in whole social systems, a principal implicit research question has been, "What are the roles of extremist movements in the functional processes of social structures?" Data and interpretations have often emerged which

simultaneously gave insights on both levels. Thus, studies of the growth of the Nazi Party in Germany and of extremism among the European working classes have sought to determine to what extent "authoritarian personality" needs have been satisfied in these movements. Yet, merely to see the rise of these movements as an answer to individual personality needs would be to neglect the relation of these movements to social systems. Thus, students of Fascism and working class extremism have been led toward examining such phenomena as the effects of systems of social stratification upon certain sectors of the population, to see the ways in which whole sectors have been threatened by structural shifts and other processes in society. From such studies, the dynamics of extremist parties can frequently be related to the responses induced in broad sectors of society through processes of social change.

Recent interpretations of American ultra-right wing extremism extend this analysis, by suggesting that many of the principal sectors of support for rightist extremism are in those strata of American society most subject to rapid and disorganizing change. Small town small businessmen who are losing their abilities to compete in the whole society as well as in the economy have formed a special sector of support for certain ultra-conservative, fantasy responses to the Cold War, even though these individuals do not necessarily or even usually reflect "authoritarian" or "paranoid" individual personality patterns. Rapidly growing geographic regions experiencing rapid influxes of people who have been horizontally or vertically mobile in society form contemporary centers for ultra-conservative reaffirmations of traditional values. In these stratificational and geographic sectors of America, pressures toward anomie seem acute. In this light, political extremism may have certain adaptive and integrative functions in the short-run.

Interpretations of extremism should not be exclusively focused on conservative, traditionalist, or radical rightist phenomena. Communist parties, particularly in their "hard-line" segments, and many working class groups under stress reflect fully as deviant a set of individual personality needs, and just as coherent a grouping of mass responses to social structural pressures operating against their members. Similarly, if analyses of religious extremist groups are included in the consideration of the general phenomenon of extremism in complex society, it becomes clear that extremist responses can take ideological forms which are independent of the limited "left wing-right wing"

dichotomy customarily used to array and contrast political ideologies. A militant proselytizing cult may seek to make conversions to a utopian New Zion or to a way of addressing humanity to the imminent end of the world. Whether these religious responses represent total fantasy withdrawal from the present world or an attempt to build a functioning society of believers within it, or other responses, they frequently do not depend upon taking a coherent position in the political spectrum. Yet they reveal the same extremist dynamics as the political movements from which so much awareness of the meaning of extremism initially came.

America's contemporary religious pluralism offers a wide basis for participation in religious activity and thus wide possibility for religiously-oriented perceptions of and controls on the post-attack world. Although religious freedom varied widely in Colonial America, the growth of the society and the constitutional disestablishment of religious organizations have been among important factors in producing a wide variety of possibilities for religious participation today. Numerous small cults and sects function on the periphery of legitimacy, especially in areas of social structural dislocation (e.g., centers of rapid in-migration by lower status socio-economic groups; areas isolated from but under pressure by the cultural change associated with increasing social complexity, where there are preserved possibilities for radical fundamentalism in religious definition of the world). It is tempting to see these small cults and sects as possible centers of escapist, fetishistic, ritualistic responses to disaster. It may be more important, however, to ask how religious groups enjoying more widespread legitimation in society may operate to produce what are, objectively, fantasy and maladaptive responses to massive attack. For example, "faith healing" as practiced in both lower and higher socio-economic status religious groups has received widespread attention in national communications media. Under conditions of post-attack stress, is it conceivable that some individuals would be attracted to possible appeals that the powers of a faith healer are sufficient to remove the dangers of sickness or death from exposure to radiation? What might happen to the clienteles of faith healers under these conditions? If denied access to what they believed were adequate means for coping with radiation effects, would they be targets for extremist appeals? What possibilities for the growth of religious or pseudo-scientific quack movements would exist in areas with known exposure to the less immediately visible components of thermonuclear attack?

The relatively short duration of intense weapons effects may render such issues beside the point in the end, even though fear of persisting, invisible effects might make some individuals vulnerable to recruitment by those faith healers who may make extremist appeals. But these kinds of issues are perhaps not as remote and quaint as they might appear to be on first glance. Constitutional and common law guarantees on religious freedom have frequently been invoked to insulate religious groups of significant size or individual adherents from what seemed to be good medical judgment or educational practice. Similar conflicts or seemingly non-adaptive responses, based on religious commitments related to capabilities for producing highly assertive defenses and resistance by believers, may confront the post-attack planner. If he decides to dismiss these individuals as of inconsequential numbers, he should know the full implications of his decision.

From this general discussion of contemporary extremist processes, a tentative orientation toward studying possible extremism in the recovering American society emerges. Generalizing from past studies of extremism, it can be said that during periods of dislocation in social structure, stable and interlocking patterns of complex opportunity for participating in politics and social life will decline in frequency or lessen in salience. At the same time, the immediacy and general salience of political issues, often rooted initially in economic problems, coupled with the loss of differentiated participation of political and social life at all levels, undermines the complex interchange which supports democratic parliamentary procedures and which, in turn, depends upon a fundamental social consensus. There now arises a political opportunity for authoritarian and ideologically monolithic movements, which offer simplistic total solutions to complex problems, and the opportunity for escape from stressful ambiguity created by social change. Such movements offer another and sometimes tempting alternative to democratic compromise in the working out of social and political programs for acceptance by the citizenry. A central problem of restoring operating democratic institutions and practices may be the problem of anticipating and controlling the growth of extremist movements, on both the extreme ideological Left and the extreme ideological Right as well as on other ideological dimensions. This is because such movements may offer outlet from the need to make commitments to long-term problems of restoring a heavily damaged pluralistic society. They may unrealistically seek to foreshorten and redirect what may be at best a long-term and difficult process of recovery. If allowed to gain control of political life, they may destroy

the democracy which characterizes the society. If suppressed too quickly and too earnestly, the effects of suppression may ultimately undermine the democracy, while depriving the nation of a healthy sense of a restored democratic debate.

The researcher will note that this background discussion of the theoretical and general bases for considering possible post-attack extremist behavior has emphasized possible kinds of organized extremist threats to crucial political arrangements or to making adaptive, reality-oriented responses to post-attack environmental conditions. Thus, one large variety of collective behavior has been the principal focus. This behavior has implied relative coherence of extremist groups as collectivities, even though individual behavior in these groups may be relatively incoherent and idiosyncratic. It will be important to remember in this research, however, that extremist behavior can be relatively lacking in ideological or sophisticated cognitive content, that it may take the form of mob or crowd or small group deviant activity which is responsive to immediate situations, and thereby vulnerable to decisive techniques of control. It is conceivable that such crowd activity could involve a limited group of participants, rather precisely focused on immediate situations. But several historical-journalistic accounts of disaster have reported large scale scapegoating behavior by mobs roaming in disorganized cities stricken by disaster. (In the Halifax explosion of 1917, German aliens became the target of wrathful outbursts and "blame" for events leading to the explosion. See Michael J. Bird, The Town That Died: The True Story of the Greatest Man-Made Explosion Before Hiroshima, New York: G. P. Putnam's Sons, 1962, pp. 159-161. In the Tokyo earthquake and fire of 1923, people thought to be Koreans were attacked by Japanese, who charged that the Korean minority was using the disaster as an opportunity for mass incendiarism. Noel F. Busch, Two Minutes to Noon, New York: Simon and Schuster, 1962, pp. 105-113. "By the third day after the quake, the Korean scare was over and the police had in fact established a barracks outside the city where some ten thousand of the immigrants received shelter, sustenance and protection." Page 113.)

Research directed toward possible post-attack extremism should be oriented with reference to a view of collective behavior which is adequate to allow consideration of both outbursts and sustained movements. Beyond the fact that both may, at different times or the same time after attack, be problems for the administrator, there is considerable theoretical interest in the ways in which outbursts, whatever

the original motives and needs being served, may sometimes provide opportunities for the formation of extremist movements. An initial, rough hypothesis here would be that outbursts are more likely than movement-organized behavior in the early time phases following attack. The complementary hypothesis would be that these outbursts will be replaced in frequency of incidence by more organized forms of extremist behavior, as the society moves into reconstruction activity. These forms of extremist movements may constitute a more subtle management threat to the administrator than outbursts, since outbursts occur under short-term conditions where it is difficult to maintain their appearance of legitimacy, and where direct administrative control measures may be more allowable.

For the planner, a useful general lesson from a study of extremist phenomena will be an increased understanding of the extent to which all political and social life contains "irrational" elements. This should help to control his fear of the possible social disorganization following attack. An assumption of moderate democratic systems tends to be that all citizens can engage in a rational process of debate and compromise. The various levels of analysis in the behavioral sciences from which the analysis of extremism derives suggest that the distinction between the programs and processes that make for democracy and those that encourage extremist and totalistic systems is frequently a distinction of degree. Studies of the complex pluralism that institutionalizes democracy and the many ways in which individuals are dependent upon large-scale societal processes provide the planner with suggestions about how to protect the mass of the citizenry from extreme subjectivism and how to make them more directly face their continuing responsibilities as thinking citizens. Contrastingly, understanding of the social structure and individual motivational processes which can lead to extremism enables the planner to remember that he must plan to maintain an environment for democracy, even if many citizens seem to retain their individual rationality and discipline of judgment.

(c) Research Questions:

What kinds of extremist movements may be expected in post-attack society? On what evidence are they to be expected? What are the indicators of growth for extremist movements in post-attack society? To what extent do these movements belong to the larger restoration of

democratic debate in society, and thus indicate potentially healthy trends which should not be compromised in a premature attempt to control anti-democratic influences on political life? How can extremism be seen as an adaptive response to abrupt and brutal social disorganization? On the other hand, when do these potential movements become dangerously dysfunctional? What are the limits of dissent in post-attack society, as an operating democracy is restored, given the magnitude of the reconstruction problems to be faced and the fundamental goal of maximizing democratic participation and debate? What institutional arrangements will be required at what points in recovery to control political extremism?

(4) Range of Behavior to be Studied:

Political sociology and the sociology of religion, and closely related fields in history, social psychology, and political science, have a rapidly growing body of data which illuminate the etiology of extremism. The present study should emphasize extremist movements in Western European and American society, from the time of World War I to the present. Of special interest is the growth of revolutionary and reactionary movements in societies experiencing political and social unrest as a result of economic change coupled with war. The political range here is from revolutionary Communism on the extreme Left to Fascism on the extreme Right. Data on the popular culture and politics of American life on the rapidly growing "home front" of World Wars I and II will be especially instructive, since these data pertain to a society undergoing horizontal and vertical social movement and a rapid economic growth and rise in consumer income.

Existing data on sectors of a society attracted to extremist political and religious solutions will include data on groups undergoing profound shifts in relation to the larger society, but within a society which is stable and engaged in the general maintenance of normal democratic institutions. These groups in the United States are from diverse sectors, such as certain groups of small businessmen and the recently mobile (who form part of the principal support for movements of nostalgic reaction to and withdrawal from American commitments in world affairs), certain ethnic-religious groups (such as the Black Muslims), nationality groups (such as the German-American Bund), and age groups (such as certain religious cults which deal with the acquisition of personal power in the face of declining health, and sub-sectors of movements in the 1930's to increase old age pensions). Sources of threat to these groups are not only a result of structural shifts in society; to give a contrasting example, they may be the result of inescapable or difficult-to-modify personal characteristics which receive unfavorable evaluation in the larger society. Historical accounts of phenomena such as American nativist movements in the 1840's and the Populism of the 1890's may provide evidence of continuing trends for particular groups, and suggestions regarding means of coping with newly arising extremism among these sectors.

Useful comparative data may be obtained from anthropological records of extremist movements in non-industrial societies, where these societies were forced to cope with more complex societies. Frequently these societies experienced sharp perceived reductions in the effectiveness of native institutions. The Cargo Cults in Melanesia and Micronesia, especially as a result of World War II, and the Ghost Dance of the American West in the 1880's and 1890's may provide data which

illuminate constant structural processes in the extremist responses to an ambiguous and threatening world which has resulted from profound institutional disruption.

(5) Areas of Application of Findings to Civil Defense Programs and Countermeasures:

(a) Arrangements for democratic participation in all levels of directing social recovery must specify procedures for re-integrating potential extremists into a pluralistic order. Democratic participation and the restoration of pluralistic political participation begin in the shelter phase following attack.

(b) Criteria for deciding when democratic procedures are and are not paramount in societal recovery should be established and legitimized as part of a continuing legal and policy tradition. This tradition includes judicial determination for resolving contests and conflicts based on these criteria. Judicial institutions as protectors of rights to political action may be established for the political conditions of post-attack recovery. Legislative watch-dogs (and supporting criteria) for party and voter registration may be established to provide continuity of tradition from pre-attack and post-attack society; these agencies may require the establishment of criteria for closely observing the trends of post-attack life.

(c) Reservoirs of trained leadership in voluntary associations may be prepared to participate as democratic leaders in post-attack society where political life is being reestablished. These voluntary associational leaders may be trained to maintain a democratic organizational base among individuals who might be recruited for or might influence recruits to extremist movements.

(d) The content of public information programs about desirable forms of individual participation in the rebuilding society, both immediately and in the long-run after attack, must take cognizance of potential extremist phenomena. The meanings of particular forms of extremist response must be made clear and acceptable within broad limits. It may be necessary to use the phenomenon of individual or group extremism as a topical focus for reminding citizens of their democratic traditions and responsibilities. An open analysis of extremism and the personal and group processes which it reflects may provide the opportunity in the post-attack situation for inculcating a contrasting commitment to democratic procedures in all of civil life.

Study 4.8

VOLUNTARY ASSOCIATIONAL RESOURCES FOR SOCIAL ORGANIZATION

(1) Subject for Research: Surviving group structures, processes, and latent patterns of social organization and individual motivation in voluntary associations, which will provide foci, at varying levels of institutional complexity, for ordered behavior in a society disorganized on its customary levels of functioning

(2) Requirement for Study:

Survival and reconstruction from the effects of massive thermonuclear attack will require the mobilization and direction of social as well as material resources, and the implementation of programs through processes of group action and control. The United States, as a target for massive attack, is a complex industrial form of society with many levels and forms of social structural differentiation. A massive attack against this form of society threatens to introduce chaos into this relatively ordered pattern of structural differentiation. It can do so by disrupting the role patternings and organizational and institutional processes which bind individuals together into interdependent networkings of coordinated action. Not only are individuals, roles, and groups of roles vulnerable, but characteristic, society-wide integrative processes which result from complex inter-group and inter-personal relationships may be disrupted or broken. Through this intervention, the possibility

exists of destroying functional social processes which direct and integrate a pluralistic industrial society.

To make an immediate response to attack effects, as well as to guide long-term reconstruction and recovery efforts, key surviving individuals (e.g., civil defense planners and administrators) must know the ways in which the over-all coherence of complex industrial society can be disrupted. In their pre-attack planning and in their post-attack decisions and acts, they require a conception of societal disruption which permits the pinpointing of both the characteristics and the vulnerabilities of the forms of social order which are crucial to societal survival and recovery. These forms of order and ordering processes will exist on many levels of complexity. On one extreme will be the small group in the post-attack shelter situation. The opposite extreme will be such broad structural forms as the integrative structures and processes which inter-relate large inter-group and institutional structures under an ideology of relatively free individual initiative, in a society assumed to be at peace in its external relations. For each level of complexity of social form, the planner and administrator must be able to determine the resources of individual and organizational action which can be mobilized to achieve desired recovery states or capabilities. He must be able to determine damage and assign estimates of criticality-to-recovery and over-all viability to the crucial forms of social order, control, and integration which characterize each time phase through which post-attack society passes. Through utilization of the functional processes which order and integrate society, he must be able to direct and coordinate the activities of large numbers and groups of individuals.

To carry out his broad planning and specific directorial functions, the planner and administrator require means for defining, organizing, and utilizing the resources which may exist for preserving social coherence and organization. An estimate of the nature and scope of these resources requires an assessment of the latent as well as the manifest forms of achieving societal integration and coherence in the pre-attack world.

In the face of possible widespread destruction of formal, official organizational patterns for ordering, integrating, and directing social action on a mass scale, the civil defense planner and administrator must be prepared to use manpower and organizational resources wherever he can find them. These critical resources are likely to exist in the widely ramifying voluntary associational life which has characterized the American variant of industrial society. Voluntary associations represent a wide range of commitments, involvements, learned capabilities, and patterns of organizational function which crosscut and complement the formal mechanisms of power and resource allocation in American society. As such, they contain a wide variety of individual and organizational capabilities for coherent functioning under conditions of stress and dislocation. As a reservoir of individual and organizational capabilities, voluntary associations may contain one of the key groupings of resources for organizing and maintaining adaptive responses by individuals and groups in post-attack society, when the legitimate, formal structures of social order and direction are absent.

The resource reservoir represented by the voluntary association in the United States requires study, therefore, to determine:

- (a) the ways in which its capabilities are translatable into the performing of vital social control functions in post-attack society;
- (b) the terms in which damage to these capabilities can be assessed for both pre-attack and post-attack planning and decision purposes;
- (c) the means through which the planner and administrator can utilize surviving organizational-structural capabilities in the voluntary associational sector of society.

(3) Objective of Study:

(a) Central Research Topic:

This research should determine the ways in which voluntary associations in American life represent resources for post-attack social coherence, order, and integration. Together with an inventory of the role and functional capabilities of the major forms of voluntary association and their memberships, this research should provide a way of assigning functional criticality to the roles which voluntary associations can have in directing and integrating the post-attack social structure. The research should then project the institutional and operational means whereby the post-attack critical roles and functions of voluntary associational organizational patterns and particular membership groups can be articulated with the total societal recovery effort.

The research should be addressed to the pre-attack as well as the projected post-attack characteristics of voluntary associations, as they participate in the general process of both differentiating and integrating opportunities presented to particular individuals to seek particular goals or states of reward in society. Early in the study, a scheme of

analysis will be required which is suitable for describing the resources of voluntary associations in influencing fundamental processes of social control and integration. Yet the description of organizational characteristics should ultimately be specifiable into a means for concretely assessing the resources of particular associations and associations' memberships for engaging in post-attack directing, integrating, and reconstruction tasks.

(b) Background of Study:

The basic conception of industrial society influencing the formulation of this study emphasizes the diversity of group life in contemporary America, without necessarily assuming that it is possible, at present, to describe fully the institutional dynamics behind both the stability and changes in American life. The conception emphasizes both a high degree and wide range of social structural differentiation and an elaborate, although incompletely meshing, set of processes of integration at corresponding levels of generality. At present, the conception is primarily descriptive and static. The role voluntary associations are seen to have in a process of socio-political "pluralism" implies, however, that one of the key processes behind a dialectical process of structural differentiation and integration in American society is the meshing and reconciliation of the different interests and organizational imperatives represented by the voluntary associations. The basic commitment of the vast majority of voluntary associations to an overriding value system makes them agents of integration, control, and consensus in society, while providing at the same time wide divergence of programs, goals, and organizational capabilities.

This conception of American society provides a particular focus to the present perception of the effects which massive attack is seen to have upon an industrial social structure. Survival and recovery from massive attack are seen to impose heavy requirements upon the capabilities of an industrial society, especially during early post-attack phases when the normal functioning of the social structure has been sharply disrupted. Various kinds of pre-attack countermeasure systems (e.g., evacuation, sheltering, or other forms of direct shielding) may reduce attack effects for important groups in the population. Still, such effects as the killing of many kinds of important role incumbents, the

breaking of communication and destruction of formal organizations of various sizes, and the persistence of radioactive residues requiring careful protection and close confinement in subsistence-level communities can be expected to degrade the level of complex social functioning and structural differentiation which are characteristic of a complex society. A temporary emphasis on mere human subsistence could permit American society to exist, for a time, with a dramatically reduced level of structural complexity. Inherent in the complex life patterns of a recovered industrial society, however, is a level of structural differentiation which permits a diversity of role outlets for individual human activities and specialized organizational forms for collectivities. In a rebuilding industrial society with a democratic ideology, this structural differentiation creates opportunities for widely varied free expressions on the part of individuals and different forms of collectivities, and corresponding pressures toward controlling the social fractionation inherent in a pluralistic social system which provides wide outlet for particularistic definitions of individual and group goals.

The specification and corresponding coordination of individual and group values and goals occur at many levels of society, ranging from the primary group level to the processes through which institutionalized normative systems establish patterns of status and reward for the whole society and culture. For the civil defense planner, the voluntary association is centrally important as an area where complementary processes of structural differentiation and integration operate. This importance stems from several central characteristics of the American social structure. Voluntary associations have provided many Americans with the experience of participating in a highly differentiated and specific form of group life outside of groups directly legitimized by the society or acting as agents of the society--yet this participation has been organized and constrained by overriding values and structural pressures inherent in organizations as organizations. Voluntary associations therefore represent, for the pre-attack and post-attack planner and administrator, an important focus of adaptive cultural values. Furthermore, as organizational units and conscious memberships in their own right, voluntary associations are a potentially mobilizable structure of social action and control independent of the formal agencies of society which are sometimes specific targets of massive attack.

Voluntary associations have been a frequently observed characteristic of the American social structure and social experience, in both early rural-small town and latter-day industrial forms. Existing outside

but often closely allied to the societal mechanisms for the formal allocation of power and control, these associations meet a variety of individual goals and support a number of processes functionally relevant to the maintenance of the total social structure. Beyond this kind of relevance, however, the voluntary associations mediate much informal social participation among many of the key sectors of the population who may have responsibility for guiding and carrying out adaptation to and recovery from massive attack. While widely pervasive--whether in social-fraternal, civic action, labor, political, religious, economic interest-group, or other forms--membership in voluntary associations tends to be associated with strategic sectors of the broadly defined "middle class" in American society. It is from this stratum that much new leadership for adaptation and recovery must be drawn; at the same time, one of the critical features of this stratum in making it a manpower pool for directing and carrying out adaptation and recovery lies precisely in its commitment to a large variety of frequently overlapping or related voluntary associational activities.

On the same level of generality, but with a somewhat different empirical focus, a study of the relations between American voluntary associational and the society-wide system of social stratification which crosscuts it may point to those groups in the population who are more and less vulnerable to fractures and the destruction of the institutional framework of society. Many individuals, particularly among lower status and lower power socio-economic groups, have relatively little connection with the voluntary sector of associational life. Migrating individuals and individuals in areas of rapid growth may also experience fewer associational ties than might be expected. It is conceivable that special problems of directing, controlling, and restoring social integration to these individuals might arise in the event of massive attack, because of their divorcement from contact or experience with the processes and values of voluntary associational life. In the event of resort to voluntary associations to enhance social coherence, groups or strata relatively isolated from this sector of social participation would be unavailable for mobilization through associational ties. In fact, it is conceivable that such groups might resist the use of voluntary associational resources to maintain social order and direction, or, at the least, constitute a drag on attempts to employ these resources. On the other hand, the persistence of special neighborhood, kinship, ethnic group, and religious ties among these strata might meet the needs which voluntary associations meet in other strata,

while providing at the same time proto-structures through which personnel from voluntary associations might establish links with groups in these strata.

In times of disaster in America, voluntary associations have fulfilled a variety of support, maintenance, and restorative functions. They have emerged to complement the functions performed by primary groups, formal rescue agencies, and arms of the legitimate administration. An analysis of the organizational resources of voluntary associations should include, for the situations over time following massive attack, not only an assessment of the particular skills and roles which might be strategically located within each major type and unit of voluntary associational life, but a way of projecting and legitimizing necessary controls and direction for American society as exerted through voluntary associations. This requires a level of analysis which will enable the planner and administrator to see how the entire voluntary associational sector of group life fulfills a variety of functional roles in the American social structure, and how voluntary associations as such can be mobilized in order to mobilize the most fundamental patterns of maintaining social coherences.

This research should be, then, more than an inventory of particular voluntary associational capabilities. It should attempt to place voluntary associations in a larger framework for describing the social processes characteristic of American pluralism. The research ultimately should show the planner and administrator how voluntary associations may form a latent structure for preserving American social processes under stress. This will require not only a description and assessment of the ways in which voluntary associations do order and integrate key sectors of American life, but also how a sudden massive reliance on the surviving capabilities of voluntary associations might create pressures toward or away from legitimizing their functions. These pressures could reflect the ways in which voluntary associations are characteristic of American society in both its ruling ideology and in a stratum exercising key influence.

One important sub-category of possible voluntary association requires special discussion, because of the special ambiguities which attend the placement of this group of organizations in the "voluntary" category. This is the group of organizations formed by religious groups of various kinds and sizes, ranging from complex, hierarchical churches to struggling individual congregations, and from theological-

ideological positions closely tied to the legitimate institutional structure of society to deviant sects and cults. Many of these groups constitute potential organizational resource groups of enormous magnitude, with capabilities for especially compelling the attention of their members. The hierarchical but widely spread parish organization of the Roman Catholic Church, the system of Stake organization and welfare warehousing in the Church of Jesus Christ of Latter Day Saints (Mormon), and the traditions of congregational self-provisioning and communal welfare in some of the less tightly integrated Protestant Churches are examples of some of the possible foci for organized activity that might exist among a significant group in the population in the post-attack situation. There is an important question as to whether religious organizations, especially those with strong ascriptive membership bases, are truly "voluntary", just as there is some issue as to whether "closed-shop" unions are truly voluntary associations. For present purposes, however, religious as well as union organizations should be included in a study of organizational resources in voluntary associations. Furthermore, information on the membership characteristics and social bases of religious organizations will be especially important in determining not only the kinds of organizational adaptations these groups may make to post-attack exigencies, but also in assessing the capacities of individual adherents to make varying kinds of adaptive post-attack responses.

The centrality of voluntary associations to American society poses, finally, a group of interesting speculative problems which are not central to the present research. If there were large scale survival of voluntary associational capabilities in the smaller urban centers of the country--one of their present key loci--would the elimination of the larger urban areas under massive attack produce a shift toward characteristic class, regional, or ideological perspectives and value orientations in the whole American polity, if large reliance were placed on the organizational resources present in these smaller urban areas? What strains within the American value system could be produced by utilization of characteristic capabilities of specific voluntary groups, such as fraternal, religious, patriotic, and veterans associations?

How can special claims to legitimacy which could be advanced by certain patriotic groups, for example, be controlled, even as the symbolic values of these associations could be incorporated into themes

for rallying groups? Such problems could be of real consequence where the normal counterpressures operating in delimited local disaster situations lose their underpinning during massive dislocation. Utilization of the capabilities for personal and organizational coherence residing in memberships of voluntary associations could, conceivably, have profound consequences for the shape and style of a rebuilding American society. The planner and administrator must be prepared to evaluate these consequences, against the requirement for maintaining and restoring societal control and coherence.

(c) Research Questions:

In terms of a broad schema of critical, society-wide functions required to maintain and direct societal recovery, what are the specific capabilities and resources of the various types of voluntary associations for the processes of maintaining organized society, providing specific inputs of roles and organizational structure into survival and recovery measures, and minimizing the effects of broad structural dislocation? How can these capabilities be reduced and encoded into an inventory system which will enable the planner and administrator to assess the functional capabilities of any particular voluntary association at any level of generality, in meeting the various post-attack needs for social coherence?

In the post-attack situation, what associational forms are most able and least able to provide assistance in maintaining stability, order, and direction to social process? What skills, roles, and organizational patternings can be mobilized and utilized in each form? As contrasted with the tasks of maintaining stability, order, and direction, how can tasks of reorganization and rebuilding be initiated, expedited, supported by voluntary associations? What are the critical voluntary associational resources available for societal reorganizing and rebuilding?

How can the functions of voluntary associations or memberships in exerting or supporting authority or in carrying out survival and recovery measures be legitimized, controlled? What are the functional interdependences between the resources represented by voluntary associations, as both a general sector of social structure and as organizations with particular capabilities, and the processes of societal recovery? Within the general question posed by this relationship, how can power be organized and legitimized in post-attack society through locating its exertion partly through the voluntary sector? What kinds of constraints can be, should be imposed on this power, and how are the bases of these constraints to be preserved?

To what extent and in what ways will specific forms of voluntary association support other organizational forms in adapting to massive attack during a succession of post-attack phases? What are the characteristic forms of relevance of each major type of association to each post-attack phase and to other forms of social organization within it? For example, given a hypothetical shelter-system, what are the roles of voluntary associational experiences and procedures in stimulating supportive primary groups and adaptive organization in the shelter? Upon undertaking initial reconstruction of society, how do voluntary associations, in their various types, form possible modes for organizing production and labor? (Will a form of corporatism emerge? Should such a form of society be stimulated or supported, to enhance long-term recovery?) During the restoration of a fully functioning democratic political life, how do the interests of voluntary associational memberships form bases for legitimizing political decisions, institutionalizing conflict, and providing practice arenas for the re-emergence of both political leaders and informed citizens

accustomed to participating in at least a minimum of political processes? (Note the assumption that seems to reside here--that immediate post-attack society will be relatively authoritarian in order to meet adaptive needs--may be questioned. If so, another question arises: What is the possible role of voluntary associations in preserving characteristic American political processes through the crisis of massive attack?)

Among groups of low socio-economic status and power, and between these groups and other strata, what problems of control and integration will arise when formal, legitimate institutions and organizations are disrupted? How can and do voluntary associations based in other strata communicate with and control these groups? Do the voluntary associations based in other strata communicate with and control these groups? Do the voluntary associations--or the capabilities inherent in some of their membership roles or organizational devices--provide a means for offsetting possible feelings of anomie among these lower status and power groups? What processes internal to groups or individuals not associated with the voluntary sector could arise in times of dislocation to obviate the need for or, indeed, oppose, the resources for organization and social coherence represented in the voluntary sector?

What required capabilities of voluntary associations are likely to withstand massive attack? What are the limits to the feasibility of using these capabilities in specific post-attack countermeasure systems?

Study 4.10

SURVIVAL OF FAMILY AS ORGANIZATIONAL FORM

(1) Subject for Research: Description, assessment, and modes of utilization of possible surviving forms of family structure, organization, and relationship in meeting the short-run and long-run needs of individuals and groups in the post-attack world

(2) Requirement for Study:

As one of the truly basic and widely pervasive units of social organization, the family performs many of the crucial functions which lead to the growth and maintenance of individual human lives. These begin with obvious ones of physical maintenance and nurturance, especially for children but also for humans at the several central age levels, but they include furthermore a number of symbolic and organizational functions which affect the psychological well-being of individuals and the allocation and direction of the economic, political, and moral resources of society. For the rising generation, families provide the legitimized centers of procreation and orientation. For the generation in the full competence of life, families form the center for a group of vital dependency relations, and a setting and cause for decisions which shape specific consumption patterns and general styles of life. For the aging, redefinitions of personal status in relation to a set of changing family relationships are often central to the problem of finding a meaningful social role in the American culture. Through all age levels and for the majority of individuals, families provide a centrally important

primary group. The presence or absence of patterns of family organization and relationship is a major structural constraint shaping the behavior of individuals.

The capability of the family as a form of social organization for performing varied crucial roles may be severely impaired by massive attack. This impairment may be reflected in several levels of attack effects. Family members may be killed or hindered in carrying out full life patterns, or the demands of other, non-familial roles in the post-attack world may successfully take priority over perceived family obligations. The patterns of communication and support which form the basis of intra-familial patterns of interaction may be broken. The organizational structures outside the family, upon which the family's ability to control the allocation of varied resources partially depends, may be so impaired as to make the family unit a dangerously wasteful mode of deciding resource allocation.

Because the crucial directing and integrating functions performed by family units in pre-attack society are such widely pervasive means of social control, and because, at the same time, these crucial functions are frequently not recognized in their full scope and complexity, it is especially important that the pre-attack planner and administrator have a coherent and detailed idea of the extent to which a massive attack could impair the performance of vital functions by the family, and the extent to which the performance of these functions will or should devolve upon other agencies or institutions. He must be prepared to project and assess a wide range of attack effects against the family, for the variety of key familial patterns in the contemporary United States. He must be prepared to understand the extent to which functions on many levels may

be impaired. These functions may range from impairment of rather precise patterns of resource allocation, to the undermining of some of the most subtle and enduring primary group relations in society. Thus, in the post-attack world, the planner and administrator may suddenly discover that impairment of family forms of organization has not only produced severe emotional discomfort, but that whole new patterns of resource allocation and consumption result, especially after the initial stages of shock, survival, and emergence from attack-shielding. In the long-run, a variety of now rigidly prescribed institutional arrangements, such as those surrounding marriage and reproduction, may come under severe stress, because of differential attack effects on the sexes, role demands on family members, and the need to conserve and organize scarce resources for maximum efficiency.

Massive attack confronts the planner and administrator with the impairment and possible loss, in many sectors and strata, of the functions performed by the family. The pre-attack planner and administrator must be able to understand the breadth of crucial functions which may be impaired, project the effects of attack against crucial functions, and establish countermeasure systems designed to preserve these functions and use them for maximum efficiency in the post-attack world. He must be able to estimate what characteristics of family organization will survive massive attack, and how these characteristics can be used in reconstruction.

(3) Objective of Study:

For the central varieties of family structure and family organization in the contemporary United States, the researcher should estimate

the extent to which crucial family characteristics and functions will be affected, altered, and impaired by massive thermonuclear attack. The research should employ the range of descriptive, analytic, and projective tools requisite to making explicit the variety of functions performed by the family. At the outset, a differentiation among family types, especially as these differences relate to differential vulnerability to attack effects, should be attempted. Here, the widely influential model of the relatively isolated, "nuclear" family, which is thought to characterize the broad middle class stratum of the population, should be brought under close scrutiny. What kinds of extended kinship ties and functions remain, in fact, upon which families do depend in the present and upon which they might depend in post-attack society? After a description of likely attack effects on the characteristics of different types of families, the research should establish the kinds and gradations among the impairments of crucial function which are likely to result from massive attack. This portion of the analysis should determine those family functions which are most vulnerable and least vulnerable to massive attack, the extent to which, with minimum support, the family will survive as a viable pattern for meeting key functional needs, and the likelihood of the effects of a massive attack requiring other agencies to perform functions now assumed by patterns of family organization.

The research findings should explicitly focus on precise functional vulnerabilities of the family, as a form of social organization, to massive attack, and on the requirements of countermeasure systems which will support family organization in the face of massive attack or take over functions where the familial functional capability has been impaired or destroyed.

(4) Research Questions:

In the contemporary society and economy of the United States, what are the crucial functions performed by family structure in the maintenance of personal and group life? To what extent, and in what ways, are these functions vulnerable to massive thermonuclear attack? What will be the characteristics of family organization following massive nuclear attack? What models or analytic-descriptive devices are required adequately to describe these characteristics? (Note: the answer to this question involves, in part, an assessment of the descriptive power of the relatively isolated, middle class "nuclear family" model, as opposed to models which allow for structural characteristics more frequently associated with extended families.) What are the sub-cultural variations (principal examples: ethnic, religious, and regional) in vulnerability of critical functions to massive attack? In what ways will massive attack alter the organizational and institutional bases, outside the family, (for family structure), in such ways as to cause pressures for change in family structure? To what extent will the basic norms of family organization--such as those governing marriage and procreation--be under pressure for change in the post-attack society? To what extent will there be role conflict between family roles and societal requirements, such as in the case of childcare roles on the part of mothers conflicting with societal requirements for the labor which mothers could provide in rebuilding? What organizational and institutional arrangements will be required to resolve such conflicts? How can these arrangements be made harmonious with those values reflected in contemporary family organization which it is deemed desirable and crucial to preserve?

What are the inherent strengths and weaknesses of family structure in coping with massive disaster? To what extent is past disaster experience, particularly in devastated countries following large-scale warfare, relevant to predicting the viability of family forms of social organization in post-attack society? As a primary group, what similarities and differences does the family have with regard to other primary groups (e.g., military units under severe stress and collapse) in ability to withstand profound dislocation and to preserve capabilities for performing vital functions?

To what extent will the family be a viable form of organization in performing functions critical to the larger society in the post-attack world, as opposed to performing functions directed to the maintenance of specific individuals in the family circle? If the "society-at-large" functions are less critical than particularistic "family-circle" functions, what new forms of social organization need to be evolved to meet needs now met by the family?

What attack countermeasure systems are both required and feasible in meeting the degrading of structural capabilities in the American family? How can these systems supplement and protect critical family functions? How can these systems provide for an adequate meeting of critical functions, where family functional capabilities have been destroyed? (In the short-run, these functional requirements may center on the need to nurture and protect dependents. In the longer-run, a broad range of institutional problems arises, including such problems as how best to organize and legitimize patterns of procreation, and how best to allocate the economic decision-making function on the consumer level.)

CONTROLLING SOCIAL DEVIANCE

(1) Subject for Research: Controlling social problems created by departures from normally accepted behavior, especially behavior which represents the continuation of deviant role behavior from the pre-attack situation

(2) Requirement for Study:

A continuing problem of social life is the management of departures by individuals from group or institutional norms. In the pre-attack society, these departures sometimes take the form of deviant roles. Being ill (psychologically and/or "mentally"), living the life of a criminal, delinquent, or addict, and inhabiting Skid Row are characteristic examples of some of the available ways of participating in deviant roles in American society. For some deviant roles, the legitimate institutional structure has little tolerance. For other deviant roles, institutions and individual life patterns which conform to societal norms permit a much wider tolerance. Illness, for example, is widely recognized as a legitimate state and role for an individual, for which the deviant is not "responsible," especially if he actively participates in therapy.

Massive attack may disrupt stable patterns for managing deviance in American society. Without these patterns of management, several kinds of pressures from deviant individuals may be profoundly disturbing in the post-attack environment. There may be clashes between deviants and individuals who conform to societal norms. In the process

of managing deviance, individuals enforcing societal norms may be so rigorous that they undermine both societal norms and supporting institutions. The civil defense planner must be able to project the ways in which deviance may become a special management problem in the post-attack situation. Through these projections, he can outline ways of continuing old mechanisms of control and planning new mechanisms of control, so that deviance will neither disrupt nor corrode norms during post-attack recovery.

(3) Objective of Study:

This research, while explicitly focused on the problem of how to manage deviance from social norms in post-attack society, will have general implications for the kinds of management and disciplinary problems which will arise among individuals who generally conform to social norms. The research will determine the extent to which pre-attack mechanisms and institutional forms and patternings of behavior for managing deviance will continue in post-attack society. It will examine the ways in which old processes of control will require reinforcement and/or redefinition in the post-attack situation. From these, planning and post-attack management requirements will be generated. At the same time, the researcher should examine the relation between post-attack requirements for managing deviance and the general limits to the tolerance for deviance which post-attack social functioning may impose upon individuals. From this, should come an increased understanding of the ways in which the conditions for individual freedom and self-expression may be optimally preserved in a highly disciplined, adaptation-focused, post-attack social environment.

(4) Research Questions:

In what ways are pre-attack institutional forms for managing deviance vulnerable to massive attack? What informal and formal methods may emerge in post-attack society for managing deviance and disciplining temporarily aberrant "normal" individuals? Will the stress of post-attack adaptation and recovery reduce toleration of deviance to a relatively low place in the hierarchy of values operating to govern social life? If so, how can this possible downgrading of tolerance and the institutional forms for controlling deviance be kept within limits? How can a projection of requirements for managing deviant behavior illuminate the kinds of group pressures toward discipline which may exist among "normals" in the post-attack situation? What institutional patterns and organizational forms will be required to manage deviance in the post-attack phases? To what extent can these patternings and forms be made consonant with democratic values?

Study 5.4

EDUCATIONAL REQUIREMENTS AND PROCESSES

(1) Subject for Research: Organizational, curricular, and social institutional requirements for restoring and adapting the educational process to the varying levels of skill, need, and social control required in post-attack society

(2) Requirement for Study:

A principal means for communicating post-attack, long-term adaptive skills and for stimulating individuals to resume autonomous lives in the recovering society is a restored system of formal education at all levels of society. A broad definition of "formal education" is used here: immediately after attack (and indeed, in pre-attack civil defense orientation work), educational processes will begin. They may serve a variety of functions even under conditions of shielding, where training and education may impart meaning to the present environment and equip individuals to work more effectively upon emergence. Later, a wider range of educational processes will be resumed, including the restoration of formal school systems. Education may operate with minimum supporting organization, but as recovery proceeds, it will become imperative to restore a more complex organizational structure. This is because educational institutions prepare a whole oncoming generation for adult roles, and in the interim, act as one of the principal mechanisms for defining and controlling that generation. For the

adult generation, restoration of the full range of educational institutions will support the process of learning and relearning the skills and professions required to adapt to the conditions caused by attack and recovery.

The educational process, at all levels of skill and need, and its supporting organizational mechanisms, function as key institutions for preserving the culture and controlling social life. The civil defense planner must, therefore, be able to project the needs and the phasing-in of the restored educational process in post-attack society. This means that he must be able to take full account of the varieties of function which formal educational processes have in society. He must be able to take properly phased steps to restore the total range of formal educational processes, general institutional patterns, organizations, and curricula, according to the evolving functional requirements of the post-attack society and the individuals living within it.

(3) Objective of Study:

Based initially on an assessment of the educational processes and patterns required to support a complex, industrial, pluralistic society, the present research project will determine the range of educational requirements for societal survival, adaptation, and recovery. The research will establish patterns of curricular content and required educational organizations for various phases of recovery. It will determine and evaluate the extent to which educational processes and organizations may assume or support a larger range of functionally important, adaptive roles in society under stress. Personnel, material, organizational requirements and teaching and curricular contents will be projected

for all phases of societal recovery, at all levels of skill, need, and social control, for all principal social functions served by the institutional patterns of the educational process.

(4) Research Questions:

What are the functions of the educational process in a complex, pluralistic, industrial society? How can these functions be discriminated? What is required to support these functions following massive attack? How do the various forms of educational requirement shift in criticality and content during successive post-attack phases? When and how will the formal educational process be resumed after attack? What adaptive functions can formal educational processes have immediately after attack? What curricular resources and content are required to institute educational processes? To what extent can formal educational processes be resumed under informal, ad hoc arrangements? What is required to translate these informal arrangements into a formal educational structure involving stable teacher-instructor roles, visible educational organizations, evolving patterns of curricular content, and the capacity for interactive and integrative functions with local populations which support particular educational organizations?

Study 5.5

ROLES OF RITES OF PASSAGE

(1) Subject for Research: The adaptive utility and necessity of explicitly preserving rites of passage in society; examples: the institution of marriage; social requirements for treating the dead or coping with the fact of the absence of the living and known loved one

(2) Requirement for Study:

Marriage and burial ceremonies are examples of rites which mark the passage of the individual human among the major physically and culturally defined stages of life. Such rites provide important ways of defining new status for individuals and of enabling them and/or their various reference groups to act out and accept their new status in life. Beyond fulfilling these functions for individuals, such rites are important functional institutions for defining and controlling the generational structure of society. During conditions following massive attack, it is probable that enormous pressures will be put on these rites, through alterations in the numbers of individuals flowing through them or in the institutional and organizational bases for practicing them. These conditions will probably arise in immediate or longer term post-attack society, where there will be unprecedented numbers of dead for disposal, or possibly drastic losses among those deemed able legitimately to perform ceremonies of marriage. (An additional pressure on the institution of marriage may arise if there is sharp depletion in the number of marriage

eligibles in one sex group. See Study 2.1, "The Post-Attack Demography of Society".) Stresses attending the inability to act out feelings toward the status of the dead may be especially difficult to manage, where it may be necessary to cope with death ad hoc on vast scale.

Research on the adaptive importance and possibilities of preserving rites of passage in the post-attack situation is required to establish the kinds of needs which must be met when great strains are placed on normal rites of passage, and the ways in which it may be feasible to adapt rites of passage to meet these strains. This will equip the civil defense planner and administrator to anticipate the consequences of sudden or mounting overloading on key rites of passage, and resulting functional needs which will require satisfaction or outlet in the post-attack situation.

(3) Objective of Study:

This research should examine the kinds of possible pressures and the functional importance of the pressures which may be placed on key rites of passage in the post-attack situation. While the research is oriented to several kinds of rites of passage, including those where new roles are assumed by the living toward the living and where new roles are assumed by the living toward the dead, it may be especially helpful for immediate post-attack planning to focus on the problem of dealing with the dead. While needs of couples for the legitimizing ceremony of marriage may mount in the face of losses of personnel, facilities, and records for conducting religious ceremonies (and, indeed, civil ceremonies), the really urgent pressure on rites of passage in post-attack society will apparently come rather quickly, in pressures on means for

coping with the dead. Marriage can be deferred, but the bodies of the dead must be processed quickly. Thus, the principal emphasis of this statement will be upon the social functions of burial rites.

Sociological and anthropological evidence suggests the crucial role of funeral and burial ceremonies in enabling survivors to cope with the fact of loss. Not only are the ceremonies personally fulfilling for survivors (for a variety of reasons, which may range from meta-physical and theological to ego-supportive), but they provide functional and adaptive processes for integrating social structure. But when dead suddenly or over a short period of time occur in large numbers, under conditions where there may be limited tolerances or resources for treating the dead, some modifications of culturally and socially supported or required funeral ceremonies may be necessary.

This research should focus on the varying problems which may surround the disposal of the dead under post-attack conditions. Deaths both inside and outside shelters should be considered, as they may create individual-psychological and social evidence of stress in individuals and groups, general problems of ritual treatment, and sanitation problems. For those who die sometime after attack impact, or who are found dead upon emergence from shock and shelter, there may be special problems of disposition resulting from the incidence of these dead in a disorganized social and physical environment.

This research should conclude by examining the possible structural and functional similarities between burial rites and other rites of passage in the post-attack situation, in order to achieve the beginnings of guiding propositions about individuals' behaviors when individuals are deprived of fully effective mechanisms represented by pre-attack rites of passage.

These guiding propositions will assist the planner and administrator in ordering priorities among the various needs and demands created by large numbers of dead.

(4) Research Questions:

What modifications in funeral practices may be required in the post-attack situation, during shock-and-shelter, emergence, and initial reconstruction phases, when the remains of the dead exist in large numbers and under conditions which impose limitations upon their handling? What minimum social functions of ceremonial treatments for the dead must be preserved? What are the limitations of burial ceremonies, which preserve orderly transmission of life from generation to generation, in situations of massive death cross-cutting several generations? Must the ceremonial and social functions of funerals be preserved within the framework of existing religious institutional practices? At what points and in what ways must religious demands and rights yield to larger societal requirements for the rapid and efficient disposal of the dead? (These larger societal requirements include especially public health requirements, but they also include requirements that social institutions focus survivors on future-oriented activity leading to growth, and not on the facts of loss and sudden deprivation.) How will burial sites be determined and managed? What is the legal and ritual status of these sites? At what time after massive attack will failure to perform crucial functional parts of funeral ceremonies be manifested in individual behavioral or social institutional problems? What long-term effects can be expected from the breakdown of funeral practices, where successful adjustments in these practices are not made?

What are the functional similarities and differences between funeral rites and marriage ceremonies and institutional practices? What are the general limitations on the planner-administrator's ability to intervene in these practices? To what extent can civil practices replace religious practices in these two institutional areas after massive crisis?

(5) Range of Behavior to be Studied:

Variations in contemporary American practices for coping with and treating death will be considered, especially as these variations exist among religious and ethnic groups, and from community to community. On the basis of this comparative study of funeral and burial practices, plus available sociological, anthropological, and historical evidence from other societies and cultures, an assessment should be made of the minimum necessary social functions of funeral practices which must be preserved as preconditions to societal recovery and the restoration of institutional, generational, and individual-psychological coherence in society. The need for preserving ceremonial treatments of the dead or defining the dead in functional ways should be assessed in the light of estimates of the immediacy required in disposing of the dead and reorienting the survivors toward tangible, future-time-oriented activities. It may be instructive to examine how particular religious groups have adapted to the problem of disposing of the dead under conditions of extreme continuing privation, such as those which prevailed in the wake of the Black Death of the Middle Ages or in the concentration camps of World War II, where orthodox religious practices were subjected to special pressures.

Similar ranges of behavior on the pressures to which marriage institutions have been subjected should be considered. It may be of special interest here to consider the ways in which marriage ceremonies have been preserved under wartime conditions, and the ways in which laws and customs of marriage have been modified in societies where large numbers of males were killed in war, as in Germany after World War II and France after World War I.

(6) Areas of Application of Findings to Civil Defense Programs and Countermeasures:

(a) Modifications of existing funeral and burial arrangements will be considered, to enable, where possible and necessary, the preservation of at least the necessary minimum functionally important components of ceremonial practices in situations of mass burial or disposal of remains. These modifications should be made across religious and ethnic boundaries, wherever possible, perhaps through developing techniques for burying in the name of the whole society. The analyst may find, however, that quick disposal of remains is, in the end, less threatening than attempts to preserve what seem to be functionally important social usages.

In the light of possible damage to the means for practicing marriage ceremonies, and/or to the generations especially served by these ceremonies, means for alleviating the pressures on marriage institutions in post-attack society in the short-run and long-run should be considered.

(b) Mass burial techniques for meeting possibly competing needs of insuring public health, restoring necessary motivations to participate

in recovery, and preserving institutional coherence should be considered.

(c) Various means for coping with and defining death in tightly organized communal shielding and barracking situations should be examined. These means may represent special case modifications of mass funeral and burial practices.

RE-EMERGENCE OF POPULAR CULTURE AND ITS CONTENT

(1) Subject for Research: Re-emergence of the popular culture after attack, and the control, through means consonant with American values, of themes which may impede individual or group adaptation to situations or tasks required by societal recovery

(2) Requirement for Study:

Beyond the immediate impact and shock-and-shield phases of massive attack, opportunities for messages which are not exclusively preoccupied with adaptation to attack effects will arise in the various channels of popular media and mass communication. For the pre-attack society, the total content and themes of the various messages (words, music, images, propositions) in the mass media tend to form a multifaceted but relatively coherent "popular culture," directed especially toward the middle and lower socio-economic classes. In the post-attack situation, especially during reconstruction, the restoring of the popular culture affords an opportunity for interpreting to a mass audience the full meanings of massive attack, and the desirable kinds of recovery procedures in which the audience of the popular culture can engage. At the same time, however, restoring opportunities for the development and play of themes in the popular culture may permit and encourage the growth of themes--possibly involving combinations of both reality and fantasy--in which highly threatening interpretations and images of attack and recovery are evoked, sustained, and perpetuated.

The civil defense planner and post-attack administrative officer may face a most difficult dilemma if the popular culture becomes a center of threatening themes during societal reconstruction. On the one hand, restoration of ease and freedom of expression in the popular culture will be an important manifestation of basic societal values after disaster and crisis. Yet the unlimited expression of information and attitudes toward the reality of attack effects could, under conditions of post-attack living, create maladaptive preoccupations with these effects. The civil defense planner needs to know the extent to which threat and maladaptive activity may be stimulated by an unregulated popular culture, the ways in which he can intervene in the process of shaping the content of this culture without compromising basic American societal goals, and the kinds of content which it may be critically necessary to introduce into the popular culture for the purpose of communicating necessary information while forestalling the pathological development of threat and anxiety.

(3) Objective of Study:

This research will examine the kinds of possible relations between themes in the re-emergent popular culture and adaptive and maladaptive processes within the popular audience during various post-attack recovery phases. The informational and emotional-affective content of possible popular culture themes will be examined in relation to the ways in which these themes may enhance or hinder adaptive processes leading to societal recovery. Standards and organizational mechanisms for monitoring the content of popular culture should be considered, especially as these criteria and devices would operate within a framework imposed by American values and institutions.

A certain irreducible minimum of information about attack and recovery will officially or non-officially enter the popular culture. The popular culture, within limits imposed by disclosure of national security information, may be a principal rallying area for individuals' attitudes toward the tasks confronting them. But injecting attack and recovery information and encouraging its working into the themes of popular culture may be fear-arousing and capable of triggering maladaptive fantasies in those who attend to the media. Here a "boomerang" mechanism may operate in the attitudes of the mass audience, after the injection of this information into the popular culture.

This research should examine the possible public opinion and attitude formation mechanisms which may mediate perceptions of information and opinion about the kind of blow society has sustained. It should direct the attention of the planner and administrator toward ways of distinguishing possible desirable and undesirable ways of controlling these mechanisms. Standards for judging the structure and content of the popular culture in various post-attack phases should be developed, to provide insight into the ways popular culture can serve crucial functions in increasing understanding of the disaster, maintaining the audience's ability to make effective long-term responses to attack effects, and stimulating adaptive general education to the facts of a possibly radically altered society, without releasing or stimulating high anxiety.

Even if intervening in the popular culture is not contemplated, this study should enable the planner and administrator to gain a clearer understanding of the current state of various individual attitudes toward the post-attack world, through looking at popular culture reflections of

these attitudes. From this understanding may come, in turn, insight into processes which block effective individual responses to the post-attack world.

(4) Research Questions:

How do threatening and non-threatening themes emerge in a popular culture after disaster? To what extent are these themes related to, stimulated by, necessary informational and affective content in popular media? How can requisite information be imparted to popular culture content without threatening the audience? What are the minimum informational and emotional-affective requirements for an audience engaged in long-term recovery from massive attack? What are the psychological, sociological, and legal justifications for saying that the popular culture should meet these requirements? What are the necessary characteristics of and controls upon informal or formal arrangements for monitoring the popular culture over time? What are the desirable and undesirable themes to have emerging in the popular culture, at various times following impact?

CLAIMS AND RIGHTS OF SUFFERERS AND NON-SUFFERERS

(1) Subject for Research: The social and legal claims and rights of individuals who have been affected in different degrees and ways by attack, with special reference to managing conflicts which may arise among differently damaged sectors of society

(2) Requirement for Study:

While it is difficult to anticipate the exact strategy which might guide massive attack upon the American population, it seems probable that massive attack would affect different individuals, groups, and sectors in different and contrasting ways. If this happens, there will be differences among the kinds of assistance needed in the population, and different kinds of claims against cognizant agencies will result. Perceived differences, based upon provable or imagined differences among attack effects, may form the basis for sharp competition and conflict between those who have suffered more and those who have suffered less.

Whether or not there is direct competition and conflict, however, in especially the longer run situation following massive attack, responsible social agencies will be confronted with the task of defining and dealing with large numbers of legitimate and illegitimate claims for assistance and restitution, together with pressures from non-claimants to control amounts and kinds of allowable claims. For such situations, which may last for months and years, the planner and administrator

must be prepared to understand and control the psychological, sociological, economic, political, and legal bases of conflict generated by possible competition among those differently affected by attack. Within the framework of the American value system, he must have ways for defining and satisfying claims and needs of those who must now look beyond their immediate resources in order to begin rebuilding, while at the same time he must be able to define and implement limits to claims. The necessary behavioral science research here would show the bases of possible ranges of claims and needs in post-attack society, and suggest the guidelines for the institutional arrangements which might meet them within a larger framework of American social objectives and practices.

(3) Objective of Study:

The present research will examine the various potential bases for conflict among individuals and groups which have been affected in different ways by massive attack, as well as the bases for claims for help and restitution which might be advanced after massive attack. Sources of possible claims or conflicts among the differently affected will be traced with particular reference to the claims which relatively high sufferers and relatively low sufferers may be seen to have as the result of law, custom, what is felt to be a generally perceived consensus, or specific group pressures. The institutional and organizational forms which claims advanced by individuals or conflicts among differently affected groups might take should be projected, together with the institutional and organizational devices and procedures required for managing them. New grounds for channeling and managing legitimate and/or perceived claims should be suggested.

Studies of possible conflict will be of special importance.

Differences in losses during attack may create for administrators crucial problems of managing conflict in the face of difficult-to-resist, apparently legitimate claims advanced by the sufferers, and the need to mobilize the psychological, economic, and political resources which will enable the less hard-hit to assume crucial adaptive and recovery functions. Possible conflicts may intensify as the impact phase of attack and post-attack society recedes into the past, for fantasy grievances and claims may heighten as sufferers develop a more generalized and less specific image of the ways in which they have suffered. Such grievances and claims have, in the past, taken organizational forms in radical parties and alliances of war veterans.

In order to project some possible measures for extending aid and managing potential conflict, the characteristics the possible official, semi-official, or private schemes of compensation, restitution, and aid for sufferers should be studied. Possible pre-attack schemes of attack damage insurance will be one desirable focus of this sub-study; special attention should be given to the potential pre-attack as well as post-attack ideological, economic, and political constraints upon such schemes. The possible magnitude of attack effects may be discovered to introduce special limitations upon the effectiveness of compensation schemes. The base in resources to be used for compensation in the longer run may be severely limited relative to needs, and it may be subject to varying levels of priority in allocation. Pressures on resources in the early post-attack phases may deplete or slow the generation of a base for longer term compensation. It may be useful to examine relations between schemes for managing claims in the longer run and schemes for supporting the population during

early post-attack phases, to determine the extent to which emergency support in early post-attack phases may legitimately satisfy or undercut longer term claims.

It is not inconceivable that massive damage may severely and incontrovertibly limit the notion of private property and private rights for many years following attack. Schemes for managing claims may wish to take advantage of this structural pressure on the meaning of property to accelerate the direction of resources into the basic reconstruction of society. On the other hand, reasons may be advanced for using these schemes to bolster traditional ideas of property and private rights. An important possible conflict here, on the institutional level of society, may be collisions between traditional ideas of property and right and the value which methods for managing claims might have for directing resources into channels defined as serving the ends of the whole society.

(4) Research Questions:

What individual and group claims, supported by what kinds of evidence, custom, and institutional pressure, may be expected to result from massive attack on American society? Over what areas of value may these claims be expected to range? What might precipitate and/or continue conflict among groups with different degrees of claim or differently based claims? What kinds of pressures and conflicts will result from differences among claims and their legitimate bases? What individuals, institutional arrangements, or organizations can act as effective arbiters of claims, within the American value system and social system? What would specific rates of incidence of claims and

the development of conflict over claims indicate about the rate and direction in which societal recovery is proceeding? In what ways can arrangements for compensation be designed which will also mediate potentially deeply divisive conflicts among categories of claimants?

SECTION 4

THIRTY-FOUR DESCRIPTIONS OF PROPOSED FIRST-ORDER RESEARCH STUDIES

Thirty-four proposed first-order research studies are presented in this section. Each study is presented within the framework of a standard format. A general outline of which is given below.

Standard Format for Presenting Short Proposals of First-Order Research Studies:

Study Number

Short Title:

(1) Subject for Research:

(2) Requirement for Study:

(A brief general statement of possible human behavior and central policy issues and behavioral science knowledge which lead to the need for the proposed research, and a general statement of why those responsible for establishing civil defense countermeasure systems characteristics need to know the information which would be developed by the research.)

(3) Objective of Study:

(a) Central Research Topic:

(The general substantive issues to be considered in the behavioral research, the levels of data and generalization required, and relations to other scientific or policy topical areas.)

(b) Research Questions:

(Initial questions which the behavioral scientist might have in approaching the research. Sometimes these questions directly suggest hypotheses for investigation. The questions are suggestions of the limits of the Study, and the general scope of the research, but in formulating them, the attempt was made to keep them from becoming a too precisely ordered set of constraints on the research. It was recognized that after the stimulus of a research proposal of such scope yet such brevity, many behavioral science researchers may wish to add hypotheses, questions, and issues of their own. These questions, plus the general discussion provided in the "Central Research Topic," are intended to outline the general nature of the substantive issues which must be considered, but not to prescribe the particular designs, methodology, or data to be employed by behavioral scientists.)

CIVIL DEFENSE AS A POST-ATTACK TENSION MANAGEMENT SYSTEM

- (1) Subject for Research: Post-attack implications of civil defense as a stress and tension management system for American society

- (2) Requirement for Study:

As stresses continue to be exerted on the American social system over years of international conflict, civil defense agencies may more frequently act as organizations for focusing the civil population toward adaptive responses to these stresses. They achieve these functions through acting as clearing houses for guidance on building such countermeasure systems as shelters, through instructing leadership elements in local communities, and by providing the nuclei for guiding population movements during times of immediate stress. Even short of armed outbreak, civil defense agencies may find that they are increasingly credible sources of information and direction from the point of view of the civil population, and that they act to focus and manage tensions within this population. As a result of this pre-attack growth in the legitimation, competence, and effectiveness of tension management functions, civil defense agencies constitute a latent infra-structure for exercising crucial tension management functions on the various levels of the post-attack social system. The planner and administrator need to know the characteristics of this infra-structure, how it articulates with levels of American society, and the varieties of responsibility and problems which may confront this infra-structure, as a structure for mediating critical tensions in post-attack society. He needs especially to know the characteristics of civil defense agencies as functionally specialized sectors of the social system of both pre-attack and post-attack society, and the sociological and psychological pressures which will flow toward these functionally specialized tension management sub-sectors of the social system.

- (3) Objective of Study:

- (a) Central Research Topic:

This research will assess the actual and potential structural relations and impacts of civil defense agencies on the American social system, for the purpose of estimating the capabilities of these agencies as a potential structure for managing critical tensions in post-attack American society. The extent to which civil defense agencies have, in fact, become specialized, tension management components of the entire American social system is a desirable initial focus of study. The analysis should lead toward a description of the possible kinds of societal and group tension management responsibilities which may be pressed upon the post-attack civil defense system or its fragments. For both pre-attack and post-attack society, it will be important to consider the limits at which too much tension management becomes dysfunctional for the values and processes of the social system.

(b) Research Questions:

What are the key parameters and descriptive concepts of civil defense agencies as a specialized form of social structure? What is the social nature of the tension management processes in which these agencies engage, in both pre-attack and post-attack society? What are the critical demands which will be made upon civil defense as post-attack tension management systems? Within the framework of American values, what are the limits upon as well as potential resources for civil defense post-attack tension management functions? At what levels will critical tensions exist in post-attack society?

Study 2.3

URBAN ECOLOGICAL PATTERNS

(1) Subject for Research: Long-term and short-term urban ecological patterns and processes in American society following massive attack, especially changes in the conditions for viability of metropolitan areas

(2) Requirement for Study:

Urbanized areas, from small cities to large metropolitan areas, are the key spatial and organizational foci for the American population dispersed in its environment. Various kinds of potential massive attacks may destroy the socio-environmental relationships which support urban areas, particularly in the case of large metropolitan centers. The planner and administrator need to know how attack effects on environment and population can limit or destroy the viability of present or possible urban sites, and the kinds of environmental constraints which will shape both planning for the population and movements within the population, as Americans attempt to restore urban, metropolitan cultures. In managing the post-attack population, the administrator may find severe limitations upon the urban way of life, as an ecological process upon which complex forms of social organization have evolved.

(3) Objective of Study:

(a) Central Research Topic:

This research will examine the kinds of effects which central forms of massive attack could have upon the ecological-environmental and accompanying social organizational processes which are required in maintaining viable urban centers. The analysis should not be limited to immediate effects of attack upon

urban centers, as isolated units in immediate environment; it should extend to a consideration of the ways in which massive attack could upset inter-urban relationships, where social organizational adjustments among urban centers may be found frequently to compensate for physical environmental limitations operating upon one center. (For example, a functionally specialized urban area may crucially depend upon social relationships with other urban areas to maintain its viability in its immediate ecological-environmental setting.)

(b) Research Questions:

What are the varieties of relationship between urban areas and their physical and social environments, varieties which are crucial to maintaining the viability of urban areas as forms of social organization? How can these relationships be disrupted by forms of massive attack? How can relationships with the physical environment be disrupted by destroying a network of social relationships among urban centers? What are the necessary conditions for the establishment or re-establishment of urban forms? What pressures toward urbanization will decline, increase, in the post-attack situation? What would be the physical and social resources required to maintain a population more dispersed than in its pre-attack way of life?

Study 2.4

AGRICULTURAL LIFE

- (1) Subject for Research: Patterns of agricultural life and food production, and shifts in contemporary rural-urban relationships and their trends

(2) Requirement for Study:

Attack effects in the rural-small town sector of society may have effects throughout the society disproportionate to the numbers of individuals and the degrees of complexity of the institutional structures involved. While for a time after attack impact, individuals in the whole may subsist from existing food stores, maintenance of the population will require restoration of agricultural output. In the short run after attack, rural inhabitants may have special limitations upon consumption of current crops, as a result of physical attack effects on crops, and special burden which may result from their suddenly becoming hosts for large population migrations from more concentrated areas. During the processes of societal reconstitution and recovery, normal pre-attack patterns of migration from rural areas to urban areas may be sharply disrupted, and long term pressures toward overpopulation may arise. On a variety of levels and beginning in varying periods of time after attack, agricultural output may be affected sharply by fundamental disruptions in

the relations which have existed between rural and urban areas in contemporary industrial society. The planner needs to know the basic impact of these disruptions on stability of agricultural output in the short run and in the long run, the pressures to which the social structure of the rural and farming population may be subjected and which may result in strains on food production or in the assumptions of daily rural living, the immediate post-attack maintenance needs of a sector customarily dependent on urban centers for communication, social integration, and specialty services, and the longer range effects of upsetting the markets upon which the whole rural way of life may depend.

(3) Objective of Study:

(a) Central Research Topic:

This research will determine the maintenance needs of the rural sector of society as, first, a population in its own right, and secondly, as the center for a complex set of institutional arrangements which result in stable food production for the whole society. While the needs of the rural population are fundamentally important in human terms, the crucial emphasis of this investigation should be on the ways in which the complex ecological and social institutional arrangements which mediate the production of food in American society can be disrupted by massive attack. This disruption may have crucial short run as well as long run effects, as when, for example, the rural population may be suddenly burdened with having to maintain a large migratory population from the urban centers. Such short term pressures may have fundamental impact upon rural institutions, and may be more disruptive than blast, fire, and fallout in interfering with the conditions for viable rural institutions. Pressures which might lead to the post-attack abandonment of farms and small towns should be considered, particularly as they result from ecological effects resulting in institutional breakdown or from peculiarly devastating effects of attack upon the ecological system of rural society.

(b) Research Questions:

What are the effects of massive attack upon rural society, and in what order will these effects occur? What rural-urban social institutional arrangements are central to the maintenance of an available food supply for the whole society? How will these be affected by massive attack? What is the magnitude of environmental change which would destroy the viability of rural society? How do immediate post-attack maintenance needs for the rural sector differ from those for the urban sector of society?

Study 2.5

ENVIRONMENTAL CONSTRAINTS ON COMMUNICATION

(1) Subject for Research: Environmental constraints, as a result of varieties of attack effects, on post-attack communication processes

(2) Requirement for Study:

Complex society depends upon a variety of levels of continuing communication. While the planner for post-attack society may build wireless or protected nets which enable communication without face-to-face interaction or without leaving protected environments in the relatively short run, such systems will not meet all levels of communication need, as societal emergence, reconstitution, and recovery efforts begin. For this set of post-attack periods, the planner will need to know how environmental and ecological shifts as a result of short term and long term attack effects will constrain varieties of communication and transportation in the post-attack world. Many of the constraints upon communication will be a result of limitations on pre-attack patterns of face-to-face interaction, expressed in the physical as well as social pathways of horizontal mobility in society, and in changes in the resource base for communications media and institutions.

(3) Objective of Study:

(a) Central Research Topic:

This research will determine the ways in which attack effects on the physical environment and ecological system of society will limit, modify, or redirect processes of communication and transportation within the society. It should specify the levels and kinds of constraints which will be imposed by attack effects on the varying kinds of communication processes characteristic of industrial society. Of central theoretical as well as substantive concern will be understanding the kinds of communication processes which may characterize society immediately after massive attack, and the ways in which these processes translate into, are supplemented by, or are replaced by processes which become feasible and necessary at later time periods in an industrial society recovering from a massive attack.

(b) Research Questions:

What communication processes will characterize a complex society at various times following massive attack? What are the ranges of constraint which massive attack will impose on the communication and transportation processes of complex society, through intervention in the environment and ecological system supporting society? How can communication processes be insulated from the effects of massive attack? What orders of communication and transportation processes are crucial to the restoration and continued functioning of complex society? (The data

and generalizations developed in this study can form part of the groundwork for Study 4.6, "Social Structure and Post-Attack Command Control." Whereas the problems of that study are essentially those of the social structural requirements of post-attack systems of command and control in industrial society, the focus of the present study is upon the general nature of the constraints upon communication and transportation which are introduced through attack effects expressed in the environment and ecological system of society.)

Study 2.6

ECOLOGY OF DISEASE AND DISEASE VECTORS

- (1) Subject for Research: Socio-environmental aspects of the ecology and epidemiology of communicable diseases and disease vectors

- (2) Requirement for Study:

The effects of massive attack may be expected to upset pre-attack controls on the conditions and vectors of communicable diseases in industrial society. Shifts in the conditions and vectors of disease may result not only from changes in the natural environment of disease nurturers and carriers, but from the breakdown of social control institutions and organizations which have existed to control the conditions of disease in society. In order to plan public health and social control measures for communicable diseases at various times following massive attack, the planner must be able to predict and describe the post attack conditions and vectors which, if left unchecked, would establish the ecological conditions for epidemics. He must be prepared to recognize the kinds of desirable and feasible post-attack social behavior which are essential to the control of communicable disease, as well as the ways in which the degrading of social controls over environment can be offset, before this degrading results in difficult-to-manage outbreaks of disease.

- (3) Objective of Study:

- (a) Central Research Topic:

This research should proceed from a view of the etiology and epidemiology of communicable disease which is adequate to comprehend the general nature of the social processes behind the mechanisms instituted by a society for controlling disease conditions and disease vectors in its environment. Effects of massive attack on these social processes and their behavioral preconditions and assumptions should be projected. The social structures and processes of likely epidemics should be estimated for each post-attack time phase, and possible shifts in the problems of social control over communicable disease should be described, as social life moves through successive post-attack phases. These

projections should lead to guidelines for behavior and social practice necessary to control disease outbreaks or to reduce the probability of outbreaks.

(b) Research Questions:

What are the probable effects of massive attack upon the conditions and vectors of communicable disease in society? In what ways are what social institutions and practices for the control of disease vulnerable to massive attack? What new environmental and ecological conditions for social life are likely to accentuate, reduce, the likelihood of varying types of communicable disease? What physical, organic conditions of communicable disease are more likely, less likely, to be amenable to feasible, social disease control practices in the post-attack situation? (See Study 3.4, "Expected Organic and/or Psychiatric Disabilities". The present study should increase the understanding of the basic ecological constraints upon the incidence of organic and psychiatric disabilities in individuals.)

Study 2.7

CONSEQUENCES OF PRE-ATTACK EVACUATION

(1) Subject for Research: Evacuation, as a pre-attack population management strategy, in its post-attack consequences

(2) Requirement for Study:

In order to achieve larger humanitarian and survival goals, selected sectors or regions of the population may be evacuated from possible target areas at various times before the time when it is thought that massive attack might occur. These evacuations alter the population structure of both evacuated and host areas, and establish pressures toward the formation of new social structures to deal with the life processes of changed local populations. In the event of a massive attack, the rearrangement of the population characteristics and attending social structural shifts in the social system may have the result of sharply changing the population base which will maintain the population and general ecological processes of society. The pre-attack planner needs to be able to anticipate the ways in which strategic or tactical evacuation of varying segments of the population will, in the post-attack situation, result in a total population with adaptive characteristics and management problems which are significantly different from those which would have characterized a total population without pre-attack evacuation measures. He must be particularly aware of limitations on population rebound and reproduction which might occur in a population where pre-attack evacuation had been practiced.

(3) Objective of Study:

(a) Central Research Topic:

Using, especially, demographic perspectives, this research will seek to determine the post-attack composition and processes of a population where pre-attack strategic and tactical evacuation has been practiced. The research tools should be devised to discriminate the effects of a variety of possible pre-attack evacuation plans. The possible composition and maintenance processes of populations resulting from the general kinds of possible pre-attack evacuations should be stated, to form the basis for estimating the capabilities of the population for generating and continuing social structural processes for survival and adaptation to massive attack.

(b) Research Questions:

How do possible forms of evacuation vary, in the composition and crucial maintenance processes of the populations they could produce in post-attack society? (See, for example, the differing consequences, across a variety of social policy questions, of evacuating the dependent groups in a population, as opposed to the self-supporting, autonomous groups.) How are the ecological requirements of the surviving evacuated sectors influenced by the loss of that population remaining in target areas? What are the resources in the surviving population for self-maintaining as well as adaptive activity in post-attack society? (See Study 2.1, "The Post-Attack Demography of Society", and Study 2.2, "Post-Attack Migratory Pressures".)

Study 3.3

ADJUSTMENT TO PERSONAL LOSS

(1) Subject for Research: Processes of possible adjustment to the fact or the sense of personal loss

(2) Requirement for Study:

The extremely large impact of a massive attack on a whole society may create a special category of motivational problem in individuals who have experienced loss. Organic entity effects on large numbers of individuals can be expected to include immediate death, protracted suffering, or loss of body members or faculties. Behavioral effects on individuals will center especially on interruptions and degradations of the interpersonal networks which provide patterns of role behavior, self-definition, and mutual dependence. The massive incidence of such losses among individuals may create widespread preoccupation with these losses

among individuals. The planner must be equipped to help individuals to adjust to all varieties and manifestation of personal loss, as these losses appear through varying post-attack time phases. It will be especially helpful if he can gain a clearer understanding of the general motivational dynamics behind the varieties of sense of personal loss.

(3) Objective of Study:

(a) Central Research Topic:

This research centers on the ways in which individuals will perceive acute sense of personal loss following massive attack. Among the kinds of loss to be considered are bodily damage, perceived damage to one's emotional resources, breaks in crucial systems of roles and dependence, and loss of personal, physical property or abstract placement in a property system or system of occupational rights and rewards. Varieties of possible personality resources for coping with the sense of loss in the individual should be projected, in a form which will enable the planner and administrator to conceive of feasible ways in which they may develop measures for helping individuals cope with sense of loss.

(b) Research Questions:

What kinds of loss are more salient, less salient, to individuals in the post-attack situation? What personality mechanisms exist, in the American cultural context, for coping with senses of loss? How can these mechanisms be implanted or bolstered in individuals in the post-attack situation? What senses of loss are relatively functional, or relatively dysfunctional, in encouraging individuals to make adaptive reactions to post-attack life? This study is a specialized study of a particular motivational and adaptive problem which may confront large numbers of individuals, in varying ways and at varying times, in the post-attack situation. It emerges as a separate study because of the peculiar magnitude of massive attack on a total population. See Study 3.1, "Psychological Attributes for Adaptation: Learning, Motivational", Study 3.4, "Expected Organic and/or Psychiatric Disabilities", and Study 5.5, "Needs for the Preservation of Rites of Passage". See also Study 5.12, "Claims and Rights of Sufferers and Non-Sufferers".

Study 3.4

EXPECTED ORGANIC AND/OR PSYCHIATRIC DISABILITIES

- (1) Subject for Research: Organic and/or psychiatric disabilities expected from attack effects, including psychosomatic and hysterical symptoms, and their social control and treatment requirements

(2) Requirement for Study:

Massive attack can be expected to inflict large scale and widely varying forms of bodily injury, including the relatively unfamiliar form of malaise known as "radiation sickness". It is also possible that either in conjunction with these organic physical effects, or separate from them, a wide variety of emotional responses and disorders may occur in individuals. In order to provide adequate therapy, protection, and custody, it will be necessary to know the likely forms and incidence of these disabilities in the post-attack situation, for varying times after attack impact, and the extent to which these disabilities are truly incapacitating and immobilizing.

(3) Objective of Study:

(a) Central Research Topic:

This study will identify the likely forms of organic and/or psychiatric disabilities which may be expected, under varying conditions and at varying times, among individuals in post-attack society. It will be of special value to identify differential likelihoods of incidence of injuries and disorders, by such variables as socio-economic status, geographical location, and amount of pre-attack information and training for adaptive behavior under post-attack conditions. Possible psychosomatic and hysterical-functional symptoms in individuals should be considered, as these symptoms and disorders may derive from traumatic experiences during or following attack. One important result of this research may be to indicate that there is abnormal anxiety among pre-attack planners and scientists over rates of incidence of relatively long term hysterical symptoms among survivors in post-attack society.

(b) Research Questions:

In what ways, at what rates, and in what forms, are organic and/or psychiatric disabilities likely to be manifest under varying post-attack conditions? What will be the incidence of truly incapacitating organic, psycho-neurotic, and psychotic symptoms? What are the likely forms of relatively short term disability? What definitions of "disease" or "disability" set the limits at which individuals assume the role of "dependent patient" under post-attack conditions? What are the possible similarities and dissimilarities among pre-attack and post-attack forms, definitions, and rates of individual disability?

Study 3.5

MENTAL HEALTH REQUIREMENTS IN POST-ATTACK SOCIETY

- (1) Subject for Research: Mental health requirements in social policies to aid in enhancing individual adaptation to the post-attack world

- (2) Requirement for Study:

Definitions of what constitutes "health" are frequently at least partially dependent upon definitions of "disease", yet it is also possible independently to conceive of a number of attributes of the "healthy individual" living in "normal" patterns of reasonably effective daily interaction with environment. In the particular case of defining "mental health", these attributes seem to depend on the individual's having the physical and emotional resources to live with relative stability, autonomy, and sense of happiness in his usual life. Beyond producing specific forms of disease and disability, massive attack can be expected to interfere fundamentally with conditions essential to this more generalized concept of mental health; from the disruption of these conditions can flow, also, particular forms of neurotic and psychiatric disorder which may or may not be closely associated with the effects of massive attack. In order to create as many of the conditions as possible for a climate conducive to mental health in post-attack society, it is necessary to know, for each post-attack phase and major condition, the kind of mental health needs individuals can be expected to have, and the ways in which these needs can be translated into guidelines for creating environments and situations of action conducive to mental health.

- (3) Objective of Study:

- (a) Central Research Topic:

Although there are many ambiguities in the definition of "mental health", this research should more precisely specify the conditions and parameters of individual mental health in post-attack society. Variations in mental health needs, according to the locations and histories of individual personalities in society, will result in variations in mental health requirements which will guide the planner. It may emerge for some individuals, for example, that their long term mental health in the post-attack world will be supported by their being freed to grapple with highly stressful environments, while for others, it may be crucial to moderate the amount of impinging stress, wherever possible. The ways in which mental health requirements for varieties of personality can be generated into mental health requirements for groups and the whole society should be outlined.

- (b) Research Questions:

What definitions of "mental health" are meaningful, viable, and necessary for varying levels of effective individual functioning in post-attack society, during

successive periods following attack impact? How may individuals vary in their mental health requirements in post-attack society? What modifications of pre-attack standards of mental health may result from or be indicated for post-attack life? What mental health resources will the post-attack administrator need to enhance the probability of adaptive post-attack behavior by individuals? To what extent are definitions of the conditions of mental health dependent upon particular assumptions about the form and rate of societal recovery from massive attack? See Study 3.4, "Expected Organic and/or Psychiatric Disabilities".

Study 3.6

RESPONSES OF THE UNPROTECTED

- (1) Subject for Research: Immediate individual and collective responses of unprotected people to attack

- (2) Requirement for Study:

Under many conceivable present time and future conditions in American society, large numbers of individuals will be exposed to the effects of massive attack. For those individuals who are not killed outright, and who are ambulatory or relatively removed from immediate weapons effects, strong but possibly conflicting pressures on how to organize their behavior will arise. They may be trapped in situations of perceived role conflict, they may wish to subside into passivity, they may exhibit panic behavior in the presence of others, they may express strong resentments toward individuals who were protected from attack or toward groups and organizations which they perceive as having failed to provide them with adequate protection. The problems of the unprotected may be enhanced by the fact that their unprotectedness means that not only have they not been subject to measures designed to shield them from weapons effects, but that they are divorced from the forms of integrative and adaptive social organization which frequently would accompany shielding systems. In order to give them adequate direction and social control, and to meet their needs, the planner must be able to anticipate the varieties of behaviors which the unprotected may manifest in both the short run and the long run.

- (3) Objective of Study:

- (a) Central Research Topic:

There are many linkages between the topics of this study and other studies outlined here; the special emphasis of this study is upon the ways that unprotectedness, as a structural condition of massive attack upon a whole population, may contribute an integrative focus to understanding dynamics behind a variety of possibly maladaptive behaviors in the face of attack effects. The researcher should seek to understand the ways in which individual behavioral reactions to attack may be

variously shaped by unprotectedness as a perceived, immediate environmental condition, and by how these perceptions of unprotectedness arise. He should consider the modes available at various times in the post-attack situation for meeting possible special needs of the unprotected. Special attention should be paid to ways of mediating possible conflicts among unprotected individuals, or between unprotected and protected individuals.

(b) Research Questions:

What will be the individual, behavioral responses of unprotected individuals to the effects of massive attack? What will be the reference of these responses internal to and external to individual personality systems, particularly as these references depend upon special perceptions of being unprotected? What differences might exist between short run and long run responses to the perceived condition of being unprotected during and shortly after massive attack? How do possible short run responses translate into long run responses? Are there individual personality predispositions toward particular responses to unprotectedness? What are the perceptual and learning dimensions of reactions to unprotectedness? For complementary studies on other behavioral system levels, see, for example, Study 4.1, "Organization and Requirements of the Post-Attack Role Structure", Study 4.12, "Conflicts between the Protected and Unprotected", and Study 5.12, "Claims and Rights of Sufferers and Non-Sufferers".

Study 3.7

INDIVIDUAL EMERGENCE INTO RECONSTRUCTION

- (1) Subject for Research: Individual processes of emergence into reconstruction and recovery situations, after the Shock-and-Shield Phase of post-attack society, especially requirements for processes of cognitive and motivational adaptation
- (2) Requirement for Study:

The social and non-social, physical environmental conditions confronting individuals as they emerge from the Shelter Phase can be expected to require a variety of adaptive orientations and behaviors. Since successful emergence from the early post-attack phase is a necessary precondition for the resumption or rebuilding of social life, it will be of great importance for the planner to know how the process of emergence can be facilitated for individuals, and the kinds of needs they will have during emergence. For both shielding systems and for situations where individuals are coming out of shock and disorientation at points relatively removed from weapons effects, orienting and procedural devices may be required to meet a wide variety of individual needs in the emergence process.

(3) Objective of Study:

(a) Central Research Topic:

The ranges of psychological processes and mechanisms which support or impede individual processes of emergence form the central emphasis of this study. While the individual learning and motivational requirements for adaptation to post-attack society and the necessary characteristics of emergence leaders form separate studies, they are studies which are nevertheless directly complementary to this study. The emphasis of the present study is, however, on those psychological processes which are associated with necessary processes of emergence. The goal here is to understand the ranges of psychodynamic processes and requirements for individual movement from the earliest phase following massive attack, into later phases of social life. Initially for heuristic purposes, "emergence" is conceived, for individuals, as a set of linked, time-dependent psychological processes of movement into environmental situations with many possible meanings.

(b) Research Questions:

What are the kinds and ranges of psychodynamic processes and psychological attributes which characterize processes of individual emergence from the Shelter Phase of post-attack life? What features of the emergence process cause special problems for individuals? What kinds of adaptive, maladaptive, psychological processes are triggered within individuals by the emergence process? What are the kinds and ranges of structure which planners and administrators can or should impose upon the emergence process as a process of individual psychological adaptation? The fundamental study, of which this present study is a particular specification focused around a particular functionally important process in post-attack time, is Study 3.1, "Psychological Attributes for Adaptation: Learning, Motivational". See also Study 3.8, "Characteristics of Emergence Leaders", and Study 3.9, "Problems of motivation in Rebuilding".

Study 3.8

CHARACTERISTICS OF EMERGENCE LEADERS

(1) Subject for Research: Required, desirable, and likely characteristics of leaders in the processes of emerging from the Shock-and-Shield Phase of post-attack society into the beginnings of societal reconstruction

(2) Requirement for Study:

The safe emergence of groups of individuals and the restoration of coordinated social life directed toward achieving pre-attack levels of social organization will require leaders and leadership roles. Initially, this requirement

will center around technical problems of emergence, such as insuring that individuals in the process of emerging will have expert leaders who can provide for monitoring of threatening parts of the physical environment or who can provide intelligent emotional support to individuals making accommodations to the environment. To be able to meet human needs for direction and support in the ambiguous environment of emergence, the planner needs to know what individuals and roles in the pre-attack and Shock-and-Shield Phase social structure will be able to meet possible leadership requirements in the emergence situation, for the purpose of enabling effective movement by individuals into emergence processes and toward complex social life. To know these individuals and roles, and to establish criteria for finding them in the post-attack situation, the planner must have some estimate of the likely personality characteristics of those who can meet the requirements which may be imposed on emergence leaders, and where these characteristics are likely to be found. He must know the kinds of stresses and demands to which emergence leaders are likely to be subjected, kinds of personality characteristics suited to meeting these stresses and demands, and the kinds of personality characteristics less likely to lead to effective emergence leadership.

(3) Objective of Study:

(a) Central Research Topic:

This research will focus on one part of the problem of finding, legitimizing, and utilizing emergence leadership: the necessary personality and individual ability characteristics of emergence leaders. Establishing these characteristics will depend upon adequate understanding of the situations to be confronted and the long term and short term tasks to be performed by emergence leaders. The study should suggest the kinds of situations and roles which can elicit latent leadership capabilities in individuals, social processes whereby the personality characteristics of emergence leaders are converted into active leadership, and the conditions under which emergence leadership derives from or translates into other forms of leadership.

(b) Research Questions:

Are there significant personality characteristics required in those who can and will assume leadership roles during emergence? Where can these characteristics be discovered in pre-attack society or in the early phases of post-attack society? What are the situations with which emergence leaders may have to cope? Are the personality characteristics of emergence leaders the same as those of individuals who will be required to assume leadership functions after emergence? What role do personality characteristics play in the emergence of leadership in the emergence situation, later situations?

PROBLEMS OF MOTIVATION IN REBUILDING

- (1) Subject for Research: Emergent problems of individual motivation to support and participate in societal recovery
- (2) Requirement for Study:

After emergence into a social world requiring reconstruction, long range tasks of rebuilding assume that individuals will wish to face the future and make sacrifices in present-time patterns of consumption and general behavior, for recovery goals. The magnitude of possible devastation, coupled to the long range nature of the reconstruction task, suggests, however, that it is important to make a distinction between short run motivational and learning adaptations to the post-attack environment upon emergence, and motivational requirements for the long pull toward rebuilding. It is possible, for example, that American motivational patterns will be suited to the tasks of engaging the environment immediately upon emergence, but less suited to the possibly very long term commitments to rebuilding toward ambiguous goals. It may be a relatively long time, therefore, before the full range of motivational problems emerges in an American population subjected to massive attack and faced with the problem of rebuilding. In order to maintain the pace of rebuilding, and to raise resistance to the stresses which may attend living in the post-attack world, the planner must know the extent to which latent motivational problems may arise, to impede individual adaptation and societal rebuilding. He needs especially to be able to spot diffuse and ambiguous signs of individual and group difficulties in maintaining performance in post-attack society, and to understand the personality processes behind these signs.

- (3) Objective of Study:

- (a) Central Research Topic:

As opposed to examining problems of making initial psychological adaptations to attack effects and post-attack social conditions, this research will seek to determine the extent and nature of motivational problems which emerge only after societal rebuilding has begun. Personality and social mechanisms which may be associated with the emergence of latent problems or the creation and enhancement of problems should be projected and described. The extent to which emergent problems of motivation will be seriously disruptive of recovery efforts should be estimated, together with the kinds of personal and social control mechanisms which may be necessary and desirable for managing these disruptions.

(b) Research Questions:

What motivational problems or problems of general emotional tonus can be expected to emerge in a population engaging in long term rebuilding and reconstruction efforts? Are these problems significantly different from problems of adjusting to countermeasure systems designed to shield individuals from weapons effects, or from problems of emerging into an ambiguous world? What are the relationships between the emergence of individual problems of motivation and adjustment and collective shifts in attitudes or behavior toward recovery goals? What individual life situations may trigger the emergence of motivational problems?

Study 3.10

ANOMIE IN POST-ATTACK SOCIETY

- (1) Subject for Research: Possible experiences of individual anomie in post-attack society, as a result of dislocations in social structure and socio-cultural patterns for mediating relations of individuals to social environment
- (2) Requirement for Study:

The effects of massive attack on complex society may create those acute forms of social disturbance which have been thought to lead to anomie, the condition in society which occurs in the individual when he is loosed from the constraints on behavior imposed by effectively coherent social structure and social norms. (See the classic descriptions of anomie in Emile Durkheim, Suicide, (Transl. John A. Spaulding and George Simpson, Ed. George Simpson), Glencoe, Ill.: The Free Press, 1951, Chapter 5, "Anomie Suicide", pp. 241-276, and Robert K. Merton, Social Theory and Social Structure, (Rev. ed.), Glencoe, Ill.: The Free Press, 1957, Chapter 4, "Social Structure and Anomie", pp. 131-160, and Chapter 5, "Continuities in the Theory of Social Structure and Anomie", pp. 161-194.) In post-attack society during its various phases of recovery, anomie may result in several forms of maladaptive behavior; anomie may be a particularly useful organizing concept for looking at the various kinds of individual personality disorientations to reality which may exist in the post-attack world. Research on anomie should equip the planner and administrator with clearer ideas of the kinds of needs for direction, generalized control, and emotional support which individuals may have in the post-attack world, and of the requirements for maintaining effective relations between individual personalities and post-attack social structure.

(3) Objective of Study:

(a) Central Research Topic:

Using the concept of anomie as an integrative focus, this research will project the social conditions of post-attack society which may lead to senses of individual disorientation toward the social world. The value of the concept for discriminating those conditions of social disruption which are especially relevant to producing maladaptive behavior during societal reconstruction should be tested. This research should lead toward a systematic inventory of propositions about expected post-attack behavioral effects of the degrading of social structure or the disturbance of institutions of social control and of implementing social values, especially during longer term periods of social reconstruction when the full effects of damage to social structure may become fully apparent. The concept of anomie may be particularly useful for understanding the anxieties which may arise when individuals are released from the social controls necessitated by countermeasure systems for immediate adaptation to attack, and when they must live with increasing autonomy in a society attempting to restore pluralistic institutions. Thus, the concept of anomie may enable the researcher to understand how removing the behavioral controls imposed by short term social organization designed to protect individuals from attack may reinforce the effects of disrupting the pre-attack social structure or failing to institute effective ways of relating individuals to social structure during social reconstruction.

(b) Research Questions:

In what strata and groups and to what extent for these strata and groups will massive attack on American society produce anomie? Through what forms of individual behavior will this anomie be expressed? How will the possible incidence of anomie enable the planner to predict the incidence of maladaptive behavior, particularly as individuals are gradually freed to behave with more autonomy during the reconstruction of society? Among the related studies are Study 4. 4, "Extremist Collective Behavior and Movements", Study 4. 11, "Controlling Social Deviance", and Study 4. 15, "Controlling Strains in the American Social Structure".

Study 3. 11

CHILD-REARING VARIATIONS AS CLUES TO RESPONSE
CAPABILITIES

- (1) Subject for Research: Variations in pre-attack patterns of child-rearing, as sources of variations and problems in adult individual adaptive capabilities for post-attack living: identification and anticipation of individual vulnerabilities to attack shock and to stresses of post-attack society

(2) Requirement for Study:

The pre-attack planner needs to know how individuals may vary in their basic abilities to respond to attack effects, and the kinds of emotional strengths and weaknesses they will have in the face of stress. This is particularly important if the planner has been used to seeing all individuals as existing along the same continuum of abilities to respond to attack effects. Yet one of the difficult problems in estimating adaptive behavioral capabilities for individuals living in post-attack society is the uncertainty about what constitutes relevant data for making pre-attack projections of these capabilities. In trying to estimate possible variations in the kinds of capabilities individuals have for making adaptive responses to both short term and long term conditions of living in post-attack society, it may be useful to look at patterns of child-rearing among the various sectors of American society, particularly as these patterns characterize processes of personality formation in different socio-economic and ethnic groups and strata. Where it is possible to relate adult behavior to particular patterns of child-rearing, and where, furthermore, it is possible to make predictions about adult behavior based on insight into personality dynamics gained from examining child-rearing practices, there it may be also possible to make predictions about the ways in which behavioral adjustments to post-attack living conditions will be manifested and will vary. By knowing the ways in which differences in personality dynamics result from child-rearing variations, the pre-attack planner may be able to make projections of post-attack response capabilities which allow for differences in response capabilities for significant groups in the population. By having some sense of variations in these capabilities, the planner will be better able to recognize both the requirements and limitations of measures designed to elicit adaptive behavior from individuals.

(3) Objective of Study:

(a) Central Research Topic:

On the basis of insight into variations among adult personality processes gained by examining variations in patterns of child-rearing in American society, the attempt will be made to indicate the kinds of possible abilities individuals will have for adapting to post-attack social conditions and to living effectively with them. Variations in child-rearing patterns, as these produce basic differences among adult personalities, are the predictors of variations in post-attack behavioral response capabilities and limitations. The use of variations in child-rearing patterns in this study is intended to try to provide more concrete data than is customarily available for describing differences among basic personality types in American society, but it should be emphasized that the principal interest of child-rearing practices in this study is as they reveal variations in adult personality structure and process, and the ways these variations may be manifested in the post-attack situation. This study is designed primarily to stimulate several schools of academic personality psychologists to think about how developmental theories in psychology can be employed for projecting post-attack behavioral variations.

(b) Research Questions:

What are the significant variations in adult personality processes in American society, as revealed by variations of child-rearing practices among various groups in the American social structure? What do these variations suggest about variations in possible post-attack behavior among different kinds of individuals in the society? What specific propositions and projections can be made about possible post-attack variations in adaptive behavior according to personality type as revealed through child-rearing practice? As a result of these projections, what can be the legitimate expectations of the pre-attack planner about the kinds and degrees of adaptive behavior by individuals in post-attack society during its various phases?

Study 4.2

ADAPTIVE CAPABILITIES OF FORMAL ORGANIZATIONS

- (1) Subject for Research: Formal organizations as organizational types for producing capabilities for adaptive social processes: capabilities and requirements in the case of the civilian and military bureaucratic forms of industrial social organization

(2) Requirement for Study:

In projecting broad plans for organizing individual action and group programs at various times in the post-attack situation, the planner and administrator need to know the general characteristics of the organizations required to support and direct these activities, and what kinds of social organizations will survive from pre-attack society. Since formal organizations, especially rather clearly defined hierarchical bureaucracies, form one of the principal loci for organizing collectivities of individuals toward goals in industrial society, it becomes of crucial importance to know in what ways formal organizations will survive massive attack, from what they will be reconstituted in the post-attack situation, and the various post-attack capabilities they will have for organizing the behavior of many individuals toward goals through stable, directed allocations of individual effort. A study of formal organizational capabilities and potentialities in the post-attack situation should enable the planner and administrator to comprehend the general nature of restoring formal organizational activity, the kinds of burdens that he can assume can be carried by formal organizations, and the times following attack impact when formal organizations can again become partially or fully

operative in ordering individual behavior. Research should enable the planner to understand the different ways in which different types of formal organization may retain or reassert their viability in the post-attack situation, particularly through contrasting civilian and military bureaucracies as targets of massive attack.

(3) Objective of Study:

(a) Central Research Topic:

This research should examine organizations initially on a rather high level of generality. It should seek to determine the ways in which the principal formal organizational types of characteristic of modern industrial society are, as organizations, vulnerable to massive attack, the times at which it becomes possible to reestablish or guide the re-emergence of formal organizational activity in the post-attack world, and the kinds of capabilities for organizing social activity toward reconstitution and recovery which will exist in formal organizations at varying times following massive attack. The research should lead to a set of propositions about the re-emergence phases of formal organizational activity in post-attack society, a set of criteria for assessing the ways in which differing bureaucratic forms of formal organization may survive massive attack, and an estimate of the capabilities types of bureaucracies may have for supporting and organizing adaptive social action following massive attack. The civilian and military forms of bureaucracy should be contrasted, as they may form different kinds of targets for stress and different reservoirs for organizing short term and long term social activity toward social goals in the post-attack world.

(b) Research Questions:

What are the principal types of formal organization which will organize social activity in the post-attack situation during its various phases, and how will more complex forms of formal organization be reinstituted during societal reconstruction? What types of formal organization --- particularly military bureaucracies as opposed to civilian bureaucracies --- are less vulnerable, more vulnerable, to massive attack? What needs will the civilian population have, during various post-attack time phases, for formal organizational coordination of individual activity? What types of bureaucratic organization will be available to meet these needs, and from where will come the resources to reinstitute new bureaucratic forms that may be needed? What are the characteristics of a bureaucracy as a form of target for massive attack, and what steps can be taken to insure the survival of relevant forms of bureaucracy or the institution of new bureaucratic, when they are needed to meet goals in the civilian sector of society? What are the general categories of adaptive social activity, directed toward immediate or long term recovery goals, for which formal organizations can be expected to provide the principal forms of organizing nexus? To what extent is "formal organization", for the purposes of this study, synonymous with "bureaucracy"? (Note the dependence of and political-administrative economic processes of resource allocation and combination in industrial society upon bureaucracies.)

GROUP IDEOLOGIES AND SUPPORT FOR RECOVERY

- (1) Subject for Research: Group ideologies and possible differences among groups in support of participation in reconstruction activities, or in general symbolic affirmation of reconstruction processes and goals
- (2) Requirement for Study:

The process of maintaining support for and participation in adaptive behavior following massive attack and leading toward societal recovery from attack effects may be influenced by varieties of ideological orientation toward adaptation and recovery. In a society with institutionalized pluralism of social organization and value, groups will exist which support distinct, ideological variants of the basic values of the society. In addition, some groups may advance ideological definitions of social reality and desired programs for this reality which are sharply at variance with basic values. Beyond knowing the bases upon which individuals as individuals may advance values toward the post-attack world, the analyst of post-attack society must be prepared to recognize the ways in which organizations and groups may define, support, and try to implement particular programs for the post-attack world. Given the pluralism customary in American society, it becomes important to know the nature of the group bases which may exist in the post-attack world to support or hinder participation by individuals in necessary or desirable reconstruction tasks. The post-attack administrator may be confronted with a variety of legitimate or apparently legitimate ideological attempts to define the nature of the post-attack tasks confronting society at various times following attack. He will need to know the ways in which group structures support ideological structures which, in turn, may support, hinder, focus, or fractionate recovery efforts, and the extent to which it will be necessary and possible to seek inter-group agreement to affirm recovery goals or support active participation in recovery.

- (3) Objective of Study:

- (a) Central Research Topic:

By examining the group bases for ideologies in industrial societies in both stable times and under periods of widespread stress, this research will project the kinds of group supports for ideologies which may exist at different times in the post-attack situation. The ways in which these ideologies, and their supporting group processes, may hinder or support participation in and/or acceptance of recovery goals will be examined, with special reference to the ways in which differing ideological specifications and definitions of basic social values and particular recovery goals can arise in post-attack society. This research

should equip the planner and administrator to understand more clearly the kinds of supports and obstacles to effective social action which may exist as a result of ideological groups in post-attack society, and the problems which will be experienced in achieving and maintaining a democratic consensus over recovery goals.

(b) Research Questions:

What are the social sources and group bases for ideological positions in support of, in opposition to, recovery goals which have been defined and accepted through basic political institutions? How do recovery goals and participation in and/or support of recovery processes result from influences on social process by ideological variants of basic social value systems? What are the variations among possible foci of content and emphasis in post-attack ideologies? How will claims regarding the legitimacy of their position, which are advanced by ideological groups in post-attack society, be mediated? What are the ranges of expected, desirable, ideological content in post-attack society during different phases of recovery? How can at least a minimum democratic consensus among possibly competing ideological groups be maintained? Among related studies, see Study 4.4, "Extremist Collective Behavior and Movements", and Study 4.15, "Controlling Strains in the American Social Structure".

Study 4.5

PRESERVING AND RESTORING DEMOCRATIC PROCESSES

- (1) Subject for Research: Central problems in the preservation and restoration of democratic institutions and organizational procedures and processes
- (2) Requirement for Study:

The exigencies of adapting social action and group life to the conditions of each major period of social recovery following massive attack may exert strong pressures on highly valued democratic procedures, at all levels of social life. Managing these pressures becomes a central concern of those committed to the many formal and informal ways democratic procedures permeate American social life. Research is needed which will enable responsible individuals, or those who will have responsibility thrust upon them, to discriminate, understand, and plan to cope with varieties of pressure on basic democratic procedures, whether these pressures exist at the level of small group process, large organization, in the political and economic decision-making apparatus, or in relatively disorganized and undifferentiated collectivities.

(3) Objective of Study:

(a) Central Research Topic:

This is an extensive, comprehensive research study on the kinds of pressures which responding to massive attack will impose upon democratic group and organizational processes at all levels of social organization in American society. The investigation should employ a conceptual scheme or frame of reference which is adequate to comprehend the organizational complexity and pluralism of American life, and variations in pressures toward modifications of this complexity and pluralism and of particular organizational procedures within particular sectors and levels. This research topic centers on organizational process and not on pressures toward modification of characteristic American democratic values as values; rather, it assumes that pressures toward the modification of values can begin in modifications of democratic procedures governing social decision and interaction at all levels of social organization.

(b) Research Questions:

In what ways will massive attack and the social requirements for responding to it create pressures on traditional democratic forms of social organizational life in America? Are there sufficient resources and degrees of resilience within institutional forms and social organizations to mediate these pressures? If not, how can democratic procedures be preserved or restored during processes of withstanding and attempting recovery from massive attack on the whole society? What is the range or relevant levels at which pressures on democratic forms will be experienced, and how do levels of social organization vary in resources and requirements for preserving democratic procedures? In what processes and levels of social life are authoritarian procedures most likely to appear, for each major post-attack time phase? See the related study, Study 5.1, "Preserving Specific Democratic Values".

Study 4.6

SOCIAL STRUCTURE AND POST-ATTACK COMMAND CONTROL

- (1) Subject for Research: Post-attack social structural capabilities and deficiencies in establishing required communication and command-control systems in post-attack society, particularly in view of the ultimate goal of recovery seen as implying the restoration of institutional pluralism in American society.

(2) Requirement for Study:

One of the most profound effects of massive attack on complex society may be to disrupt directly or destroy many of the conditions for the systems of control and coordination which characterize that society. In one sense, the integration of complex society depends on advanced systems of communication, command and control. These systems depend upon the possibility of establishing linkages among various levels of group and organization in complex society. If adapting to conditions of massive attack fractionates society into groups, or if many levels of social structure and organization have members who are concerned for long periods with attending to tasks of self-maintenance or re-establishing the minimum conditions for economic life beyond local areas, it seems necessary to expect that there will be great difficulties in effectively communicating messages from central authorities throughout the social system. Even if such communications are possible from transmitters to receivers, great difficulties may be experienced in getting the attention of all levels of the audience. Thus, pressures toward more authoritarian forms of command-control communication may be experienced, and it may seem necessary to establish more tightly integrated social structures and groups than have hitherto been characteristic of American life. It is not inconceivable that local, block officials may experience increasing pressures toward compelling the attention of all local residents toward official communication, and toward the evolution of forms of social organization capable of compelling this attention. Those responsible for post-attack command-control at various phases of American society responding to massive attack effects must know the extent to which communication and command-control systems will be disrupted as a result of disruptions in the social structure. Conversely, they must know how certain countermeasure systems, such as shelters, may increase command-control capabilities. They must know how short term disruption or longer term pressures away from attentiveness to command-control systems create pressures toward more authoritarian forms of social organization, and how these pressures can be controlled while protecting the safety and welfare of the population.

(3) Objective of Study:

(a) Central Research Topic:

By considering the effects of massive attack upon systems of command and control which characterize complex, industrial society, this study should seek to establish the social structural requirements for systems of communication and command-control at various time periods following massive attack against American society. The hardware characteristics of such systems are less important for consideration here than the forms and kinds of social organization upon which effective coordination and control of post-attack society will depend. This study should point to the social structural problems of communicating with an American population whose normal forms of social organization have been disrupted or modified by massive attack. This assumes that features or modifications of the American social structure which are salient to command-control

for the public welfare can be described, as they may have been affected by or as they may result from massive attack. This study should outline the social structural requirements of post-attack command-control systems in American society, while suggesting both the possibilities and the problems of keeping these requirements consonant with American institutional pluralism.

(b) Research Questions:

What will be the communication and command-control requirements for each major phase of post-attack American society, as these requirements affect the composition of the American social structure? How will massive attack affect the structural preconditions for effective command control in American society? What modifications in American social structure will be necessitated by post-attack command-control problems? At what points do these possible structural modifications, which may result from, for example, countermeasure systems, uses of military systems of social control, reactions by groups to environments following attack, long term preoccupations of individuals and groups, or the removal or isolation of significant sectors of the pre-attack social structure, create pressures toward the fundamental modification of customary forms of the American social structure? Will fundamental changes in informal communication processes in American society create special command-control problems, as, for example, when "opinion leaders" are killed or removed from local groups? How can possibly conflicting requirements for (a) insuring public safety through effective command-control systems and (b) preventing the growth of totalitarian institutions be resolved?

Study 4.7

HYPOTHESES ON CRISIS AND SOCIAL INTEGRATION

- (1) Subject for Research: The test of plausible alternative hypotheses regarding the effects of crisis on social integration
- (2) Requirement for Study:

Social integration is both a process and a result of effective institutional mediating and balancing of varying and sometimes competing values, group pressures, and individual needs. Integration is a crucial functional process in complex social systems, particularly in those where there are legitimate alternatives for specifying basic cultural values within a framework of institutional pluralism. It may be argued, however, that in all social forms, functionally integrative institutions at least partially offset forces pushing toward social disorganization. It is possible to argue that crisis affecting social systems creates pressures toward social disorganization and collapse. The magnitude of a massive thermonuclear attack suggests almost intuitively that such pressures would

exist in a target society. On the other hand, numerous disaster studies indicate that strong integrative forces seek to offset the effects of the disruption caused by disaster, both within the institutions of the stricken area and in the outside society. Yet these studies do not encompass massive attack on a complex society. Varieties of integrative pressure are experienced in social systems under disaster. These pressures can range from adaptive teamwork of small groups and the quick resolution of role conflicts within individuals to varieties of complex institutional adjustment to meet the altered conditions under which a post-disaster social system must exist. Indeed, individuals and groups previously isolated in the social structure may address disaster with new élan, acquire new identities from stress, and thereby form foci for directed action and social control. In estimating the basic capabilities for focused, adaptive behavior at all levels of the American social structure, the analyst may wish to try to determine the ways in which massive attack would create pressures toward disintegration of the American social system at all levels and, on the other hand, what kinds of integrative pressures and behaviors might offset these pressures or arise to meet modified conditions of institutional, organizational, and individual functioning. This would enable the analyst to gain a clearer understanding of the viability of forces for integration in the whole social system; thus he would acquire an assumption base concerning the amount and varieties of stress which can be managed by American institutions of social integration.

(3) Objective of Study:

(a) Central Research Topic:

In this basic research study, hypotheses derived from previous studies of groups, communities, organizations, and societies under stress will be examined. The study will specify alternative hypotheses and plausible hypotheses that may appear contradictory, on the degree to which massive attack may produce integrative, disintegrative, institutional pressures and collective and individual behaviors. Using data which project the effects of massive attack across all levels of the American social structure and institutions, the study should attempt to determine in what ways massive attack may be integrative, disintegrative, in the American social system, and in what ways integrative pressures on the institutional level and integrative behaviors on the role level can be encouraged. This study is designed to equip the analyst with more systematic knowledge of the nature of processes toward social coherence and integration in post-attack American society, and not with particular requirements for particular counter-measure systems.

(b) Research Questions:

What hypotheses on social stress and social integration can be derived from existing bodies of literature? On what levels of institutional functioning or overt behavior are integrative, disintegrative, pressures likely to be experienced

in American society under massive attack? What forms are integrative processes likely to take in American society, at each major post-attack time phase? How can processes of and pressures toward social integration in American society after massive attack be created or enhanced? See the related study, Study 4.15, "Controlling Strains in the American Social Structure".

Study 4.9

USES OF SMALL GROUP, PRIMARY GROUP,
REFERENCE GROUP PHENOMENA

(1) Subject for Research: Measures for preserving and utilizing small group, primary group, and reference group phenomena to support adaptive behavior in the post-attack social order

(2) Requirement for Study:

Individuals organize their behavior around a set of actual or perceived group relations. These relations may exist in small, face-to-face groups where much daily social interaction is mediated, in larger groups in which the individual is a member but where he may only occasionally or even never interact with all members, and with reference to groups from which the individual consciously or unconsciously takes his standards or perceptions of the world, and where the individual's perceptions of the group are more important than actual interactions he may have with its members. Many forms of attempt to elicit adaptive behavior in the post-attack situation will be directed toward individuals, but mediated by the groups in which individuals interact or from which they take significant components of their standards or perceptions. The planner and administrator will be enormously aided in their attempts to elicit adaptive behavior and stabilize individual and group behavior if they know more clearly the likely small group, primary group, or reference group processes which will affect their efforts or which can be mobilized by their efforts. Research which draws together, integrates, and applies the current large body of data and generalization on these types of group phenomena may lead the planner and administrator toward techniques of more effectively utilizing those crucial group structures which affect individuals' daily behavior or perceptions of the world, for the purposes of supporting necessary adaptive behavior in the short run after attack or supporting desirable degrees of social coherence during long run efforts at rebuilding.

(3) Objective of Study:

(a) Central Research Topic:

This study is conceived to be, initially, a survey, propositional inventory, and set of applications of the body of substantive data and generalization on the ways in which smaller groups of varying size (including primary groups) and reference group phenomena can mediate behavior and communication. This survey of data and generalization, possibly leading to later conduct of experimental studies, should focus on the kinds of group processes which support, inhibit, adaptive behavior by individuals in the post-attack situation, as the requirements of this situation exist at one time or as they may shift over time. The goal of the research should be a set of communication and behavioral control requirements which will enable the post-attack administrator, within a framework of democratic values, to elicit or encourage adaptive behavior through utilizing group structures which are highly salient to individual behavior.

(b) Research Questions:

Both on a high level of generality and across a range of possible and desirable concrete applications, what are those group structures and processes, normally highly salient to individual behavior, which can be utilized to support adaptive behavior and programs in the post-attack world? What group processes inhibit adaptive behavior? On what kinds of small group, primary group, and reference group processes and structures can, should, the administrator have influence in the post-attack situation? What types of small group, primary group, and reference group structures which are conducive to adaptive individual behavior are likely to survive massive attack, or be formed after massive attack? How can these structures be given support, in both pre-attack and post-attack society? In what specific ways can they be utilized to elicit or support various forms of adaptive behavior?

Study 4.12

CONFLICTS BETWEEN PROTECTED AND UNPROTECTED

(1) Subject for Research: Possible conflicts between groups who have been protected and groups who have not been protected from attack

(2) Requirement for Study:

Post-attack living will follow from or impose sharp alterations in the life situations of large numbers of people. These alterations, combined with the stresses of adjustment and long term reconstruction, can be expected to contribute

the conditions for conflict among individuals in the society. In many cases, alterations in life situation will result from having been unprotected, in one's person or effects, from attack. Having been protected or unprotected will be one of the most widely pervasive forms of social distinction in the post-attack world; since there may be large numbers of both broad types of groups, one of the fundamental grounds for persisting conflict in post-attack society may be between those who were and were not protected and, thus, those who "have" and "have not" in the post-attack world. In order to control this conflict in a society that has suffered extraordinary damage, it becomes necessary to know the ways in which protectedness or unprotectedness may provide the particular structure and dynamics of conflict. Those responsible for eliciting and directing adaptive behavior in the post-attack situation will need to know the ways in which individuals are perceived to have been protected or unprotected, the target for blame for being unprotected, the ways in which the protected and unprotected will advance claims against each other, or those held to be responsible, and the degree to which degree of protection correlates with degree of suffering as a result of massive attack. They will need to know the grounds for divisive conflicts between the protected and the unprotected.

(3) Objective of Study:

(a) Central Research Topic:

This study directly complements Study 3.6, "Responses of the Unprotected", and Study 5.12, "Claims, Rights, of Sufferers and Non-Sufferers". It differs from them in that it focuses on possible ways that social conflict can be generated from the facts or implications of protectedness and unprotectedness, instead of focusing either on individuals orientations or disorientations resulting from these conditions, or problems of restitution. This study should study the ways in which having been protected or unprotected may translate into particular forms of inter-group conflict at various stages of post-attack society, and the processes of social control which are required for managing this conflict or re-directing it toward adaptive behavior. This study can provide part of the explanations of the mechanisms for social conflict used to project the incidence of the claims that are the subject of Study 5.12.

(b) Research Questions:

In what ways will perceptions of having been protected, unprotected, contribute to social conflict among individuals and groups at different phases of post-attack society? To what extent is unprotectedness correlated with real suffering and loss as results of massive attack, and to what extent are protectedness and unprotectedness perceived and defined subjectively? What will be the targets of blame for having been unprotected? Particularly, will the blamed be those who represent legitimate authority in the post-attack situation? What measures will be required to control social conflict stemming from varying degrees of protection from attack effects? How can a study of conflicts centering around degree of protectedness illuminate the general origins of social conflict in post-attack society?

**RESTORING THE STRUCTURE AND PROCESSES OF THE
AMERICAN ECONOMY**

- (1) Subject for Research: Probable social resources and necessary social resources, and the official and/or private measures required, to restore the fundamental processes and institutional structure of the complex American economy

- (2) Requirement for Study:

A necessary condition for the recovery of American society from the effects of massive attack is the restoration of the economy and economic processes characteristic of a complex, industrial society. A money economy must be restored, capital formation and plant restoration or construction must be facilitated, and crucial decisions about the roles of the private and public sectors must be faced at all recovery phases. Central to restoring the pre-attack occupational system, division of labor, and mechanisms for allocating rewards and status will be the reinstitution of a reasonably stable system of wages and prices. Underlying the expectations which may be had about a restored economy will be assumptions about the times at which it will be possible to have full employment and a high rate of economic growth. While much effort has been devoted already to the study of the economic conditions for recovery from massive attack, and to the resources required for restoring the complex economy of an industrial society, this work should be continued and amplified, with special reference to the social structural conditions necessary for restoring a complex economy. The planner needs to know the social structural characteristics and preconditions for reorganizing the economy, the extent to which pre-attack economic assumptions and propositions will hold in the face of changes in social structure and individual behavior, and the ways in which resources for restoring the economy are dependent upon larger social processes which may impose distinctive constraints upon these resources.

- (3) Objective of Study:

- (a) Central Research Topic:

This is a wide-ranging study of the social resources required to restore the complex economy characteristic of an industrial society. It should take systematic account of existing studies on economic recovery. The social structural and individual behavioral variables in economic recovery should be given special analysis, particularly as they are the source of fundamental assumptions

about the institutional structure and processes of the American economy. The social resources, together with the official and private measures required to insure the existence of these resources in the post-attack situation, should be projected, for the restoration of pre-attack patterns of production and consumption, allocation of resources, wage- and price-setting, capital formation, occupational division of labor, and "private enterprise" stimulation to economic growth.

(b) Research Questions:

What are the social structural and individual behavioral variables and processes underlying the restoration of a complex economy? What measures can be taken in both the governmental and private sectors of decision-making, in both pre-attack and post-attack society, to insure the existence of the social resources for restoring a complex economy? See Study 4.1, "Organization and Requirements of the Post-Attack Role Structure", Study 5.7, "Legal Resources and Restoration of Civil Life", and Study 5.11, "Economic Resources for Private Enterprise".

Study 4.14

CONCEPTS AND HYPOTHESES OF "AMPLIFIED SOCIETAL REBOUND"

- (1) Subject for Research: The meanings and limits of the idea of "amplified societal rebound" from massive disaster, and tests of the hypothesis of "amplified rebound"
- (2) Requirement for Study:

As part of the general effort to establish a base line of assumptions about the capacities of American society for withstanding massive attack, there may be considerable value in turning to the systematic examination of what is frequently claimed to be a "fact" about communities or societies that have sustained disaster: that the disaster is a stimulus which produces a more vital, more rapidly growing, more complex community or society than existed before the disaster and which would have existed if the disaster had not occurred. This rebound from the effects of disaster has been denoted "amplified rebound". If amplified rebound might attend the reaction or recovery from massive attack on American society, it becomes important for the planner to know under what conditions amplified rebound might be inhibited or accelerated, and the limits which might exist on the manifestation of this phenomenon in the post-attack situation. Furthermore, the planner needs to know more precisely the composition of the "amplified rebound" phenomenon, and the time period over which it becomes manifest. He will also need to know what pre-attack measures and post-attack systems can stimulate and guide amplified rebound.

(3) Objective of Study:

(a) Central Research Topic:

This research will attempt to define more precisely the meaning of "amplified rebound", as this idea might illuminate the recovery processes of American society in a post-attack world. For this study, the amplified rebound idea is, essentially, an hypothesis. In its most general form, this hypothesis is that American society, subjected to disaster in the form of massive attack, will "grow" (in the several meanings of this term) at more rapid rates after attack than it would have grown if there had been no attack. It will therefore be necessary to validate current methods of projecting American social "growth", and to make projections, using these methods, of the rate of American social growth and change (including economic growth and change) without a massive disaster intervening in these processes. The conditions for supporting or accelerating amplified rebound in various post-attack time phases should be projected for the situation where an entire industrial society is a target of massive attack. Ways of converting possible phenomena of amplified rebound into propositions and parameters about the conditions of societal recovery should be explored. The goal of this research should be to gain a substantive, data-based understanding of the ways in which a massive attack could stimulate various structural and individual behavioral processes in American society, toward amplified rebound and recovery. This understanding should be in the form of propositions and hypotheses which will suggest to the planner and administrator the particular social programs which have reasonable probability of supporting the conditions of desirable rebound.

(b) Research Questions:

What is the meaning of the idea of "amplified rebound" when applied to a whole industrial society which is made the target of massive attack, at all levels of the organization of behavior? What are the particular conditions of and limits upon amplified rebound? To what extent does the idea of "amplified rebound" contribute to an understanding of the nature of societal "recovery"? See Study 1.1, "Conditions and Parameters of Recovery and Societal Vulnerability".

CONTROLLING STRAINS IN THE AMERICAN SOCIAL STRUCTURE

- (1) Subject for Research: Controlling processes which have tended to cause or enhance "strains" in the American social structure, for the purpose of increasing necessary social integration in social structure during societal reconstitution

- (2) Requirement for Study:

As a democratic, industrial society with a degree of institutional pluralism, the United States has a number of general strains in its social structure. One strain is rooted in differential degrees of access to opportunities, in a social structure where the achievement of social status, especially for the broad middle class, tends to replace status ascription. Other kinds of strain attend the relatively high degree of horizontal mobility in the society, and the influx of large numbers of new individuals into a community or region. Such patterns of vertical and horizontal social mobility are related to pressures toward the redefinition of the family as a social institution, and to the emergence of new problems in community life. The value structure of American society exerts great pressure toward individual autonomy and "achievement"; for many individuals, both deviant and non-deviant to this value system, there are corresponding needs for support in a network of collateral ties, particularly where individuals clearly will not be able to "achieve." In the political sector, there is a blurring of what constitutes the "public interest," and public policy formation tends, on certain issues which are highly salient to the voters, to be subject to cross-pressures among groups, cross-pressures which become part of the institutionalized folkways of compromise. Many of these sources of structural strain seem a natural part of a society without complete institutional closure and coherence, and are, by and large, accepted by the majority of citizens, even though they might hope to modify them. But under conditions resulting from a massive attack on all levels of American social behavior, these structural strains may contribute to conflict and social disorganization which disrupts efforts to restore a pluralistic society. Yet the restoration of a pluralistic society seems to depend in some measure on the continuation of the basic features of these strains in American social life. Immediately and for some time after massive attack, there will probably be tight controls upon these strains, because of the high degree of social control which may be required to transit the Shock-and-Shelter and Emergence Phases. As rebuilding proceeds, however, and as there are attempts to restore a social structure analogous to pre-attack social structure, there may be less tolerance under the conditions of post-attack living for the structural strains which were accepted in pre-attack society. If structural strains persist, but if abilities or mechanisms for managing them decline in effectiveness, other ways of managing them may be required, in order to insure the continuation of adaptive behavior in the post-attack world. The planner must, then, know how structural strains characteristic of American society will be manifested during long term societal

reconstruction and recovery, and how they can be managed without compromising those values which it is deemed desirable to preserve.

(3) Objective of Study:

(a) Central Research Topic:

The central task here is to describe those fundamental strains which are characteristic of American society, and the ways in which they may be reflected in social processes which significantly affect long term societal recovery. There are complex problems of measurement and description in this study, including those of measuring the strains resulting from American pluralism and projecting these strains into post-attack social effects. Since the reassertion of the strains which reflect the looseness of American social integration may be a symptom of societal recovery, those faced with managing post-attack strains should be prepared to see them as being, up to limits to be defined, as inevitably a part of post-attack social life. On the most general level, this study should equip the planner and administrator with a comprehensive view of the strains likely to characterize American society at any time, and which may contribute to special stresses in post-attack society. On a more concrete level, this study should suggest the guidelines for institutions and mechanisms to manage these strains and enhance social integration, in those post-attack situations where there may be less ability to withstand the structural ambiguities of American society.

(b) Research Questions:

What are the types and levels of structural strains which occur in pre-attack society but which, if left to become freely operative during societal reconstruction, might cause special stress and intolerable social disorganization? When relatively tight social control is relaxed, after the initial withstanding of weapons effects, what structural strains will reemerge in American life, and in what order will they emerge? Through what measures can individuals participating in the long term recovery effort be equipped to withstand these strains, without (a) denying them the opportunities which Americans believe exist in a relatively open society, (b) unduly restricting the looseness of American social organization? For related studies, see, for example, Study 4.1, "Organization and Requirements of the Post-Attack Role Structure," Study 4.4, "Extremist Collective Behavior and Movements," Study 4.11, "Controlling Social Deviance," and Study 5.4, "Educational Requirements and Processes."

PROPORTIONS OF DEFENSE, NON-DEFENSE WORKERS

(1) Subject for Research: Shifting proportions of members of defense and non-defense organization members in the population; mobilization, demobilization, redirection of individual effort, and resultant effects on social structure and social process

(2) Requirement for Study:

It is frequently argued that the preparatory phases of a war involving massive attack on American society would be so brief that there would be little mobilization of the population beyond the defense or national security forces in being at the time of attack. Consequently, the patterns of mobilization or demobilization following massive attack would differ from those that characterized World Wars I and II. Whether or not mobilization in the traditional sense occurs, however, it seems that very large numbers of Americans will be members, in a significant sense, of various forms of defense or defense-related forces, during and for a period of time after, massive attack. These forces will include the military, civil defense forces, and other defense-related components, such as critical occupational specialties, in which individuals will surrender at least some of their normal freedom to change job activities. Rapidly mounting international tension, the fact of attack, and the exigencies of fulfilling critical survival and emergence functions can be expected to introduce limitations upon the freedom to leave defense-related activities and organizations. Assuming that significant numbers of the population withstand the attack and the government resolves the causes which produced the massive attack in its favor, long term rebuilding and reconstruction will require the movement of individuals from defense activities and organizations to non-defense activities and organizations involved in the production of goods and services for a population engaged in civilian activities. The processes of maintaining a large defense sector represent diversions from normal civil activity in many cases. The movement of individuals back into the non-defense sector may require careful phasing, however, since so many defense functions in the early post-attack situation will be directed toward preserving the minimum conditions for a viable society and for social reconstruction, after the full effects of weapons have been experienced. Those concerned with the impact of the post-attack labor structure on basic social process in American society will need to know the variety of critical functions fulfilled by members of the broadly defined defense establishment in post-attack society, the impact on processes maintaining societal viability of reducing the size of the defense establishment while increasing the allocation of effort to societal rebuilding functions, and the ratios of defense to non-defense organization members during successive phases following attack which are proper for preserving the basic characteristics of American society. Recovery from massive attack will be partly limited by the constraints imposed by the requirement that defense and social stress-management functions be supported over a relatively long period; on the other hand,

recovery will be partly defined by the extent to which individuals can be shifted from the defense and social stress-management sector to the non-defense sector of organization and activity. To understand the implications of variations in the defense, non-defense ratio of allocations of productive individuals, the analyst and planner need methods for assessing the impact of these allocations on the structure of American social institutions, and the ways in which these allocations affect recovery goals by affecting these processes.

(3) Objective of Study:

(a) Central Research Topic:

This study should be more than a consideration of the meanings of "mobilization" and "demobilization" in a future international conflict in which the United States experiences a massive thermonuclear attack. It should be, rather, a comprehensive investigation and projection of the effects which shifting proportions of individuals in the defense and non-defense sectors can have on the fundamental social processes of the United States, first, as the nation must withstand a massive blow, and, second, as societal reconstruction begins and new allocations of labor and new freedoms of action must be reintroduced. Requirements for manpower and forms of activity, to maintain basic social structure during early post-attack phases, should be contrasted with the requirements for reconstructing a civilian society, and the problems of both institutional and individual adjustment in moving from with-standing attack to rebuilding a pluralistic society should be outlined.

(b) Research Questions:

For each phase of the post-attack situation, what will be the meanings of the "defense establishment" and the "civilian sector" in the population? As proportions of individuals in defense-related and non-defense organizations shift over time, what problems of social structural adjustment will arise in the new phase as a result of the previous distribution of individuals between the defense and the non-defense sectors? How will shifts in proportions reflected, or be reflected in, pressures toward institutional and organization change in American society? During "demobilization," how can possibly widely pervasive controls on individual behavior, as a result of the participation of individuals in the defense-related sector, be relaxed? What pressures on fundamental American institutions may result from the nature of the structure and membership of the defense-related organizations, in early post-attack phases? Will these pressures shift or relax, as more individuals move into strictly civilian activity at later post-attack phases--or will these structural pressures take new forms?

PRESERVING SPECIFIC DEMOCRATIC VALUES

- (1) Subject for Research: The problem of preserving specific democratic values under varying forms and combinations of possible stress
- (2) Requirement for Study:

American democratic values exist not only in the actions of individuals acting out their particular commitments, but as a set of general themes and cultural patterns which recur throughout the society. These themes and patterns can take the form of propositions about desirable modes of behavior. Examples of these propositions are: that individuals should be allowed to express their opinion before groups decide and act; that a certain amount of privacy is desirable for the individual; that individuals should have maximum opportunity to choose their work; that freedom implies a complex balance between liberty and responsibility. These propositions form particular components of the American democratic value system; they are propositions containing specific values which have been abstracted from the total system. Massive stress and adequately coping with it may exert fundamental pressures on the kinds of values embodied in these propositions. This may occur because the conditions of life and requirements for action and adaptation in post-attack life may not permit the full respect of democratic perceptions of individual rights and responsibilities, and democratic procedures. As a result, pressures toward temporary or permanent modifications of specific values and the general value system will arise. To understand the limits on democratic values during stress, to determine the guidelines for ways in which these values can be preserved, and to establish the cultural baseline against which ultimate survival and recovery goals can be evaluated, the analyst and planner need a more coherent idea of the specific democratic values that characterize American social as well as political life, and the particular directions in which these values may tend to shift as a result of massive stress. This will require, in turn, some way of showing how social pressures influence basic value propositions in a culture. Since there are useful policy guidelines to be derived from describing basic democratic values and their capacities, as a value system, for change and shift, it is sufficient that the analysis establish a value base line and a description of likely ranges of shift, without presenting in the present study a full analysis of the social processes which support these values or which might stimulate shifts.

- (3) Objective of Study:

- (a) Central Research Topic:

After describing the basic democratic value propositions and themes of American society, and the particular values especially subject to and resistant to pressure under conditions of massive attack and stress, the analysis should depict the kinds of changes in particular democratic values which may, in fact, be set in

motion by massive stress. Means for strengthening particular democratic values under stress should be considered. This will require an understanding of the bases of these values in processes of individual commitment and organizational and institutional functioning, and the ways in which these processes can be protected or successfully modified to meet the exigencies of post-attack stress. The goal of this research is, however, to establish a range of acceptable and non-acceptable variations in those central, particular democratic values which can be used to measure post-attack pressures on the democratic value structure. Here the emphasis is on the description and analysis of a central defining feature of society, the value system and its ranges of possible variations.

(b) Research Questions:

What particular themes and prescriptions for individual and organizational action in the democratic value system are likely to be subject to pressures for change, at different times in the post-attack situation? Where can modifications of these values be made, in their concrete operation in an environment set by post-attack exigencies, without compromising the fundamental nature of the value? How can, does, the structure formed by particular value themes and propositions form a reference which effectively specifies and constrains behavior? While values may remain stable in the short run, what long run pressures in post-attack society may create pressures toward fundamental shifts in democratic values, or cause the ascendance of one variant of a value theme, as opposed to another? See the closely related study of the social processes which implement democratic values, Study 4.5, "Preserving and Restoring Democratic Processes."

Study 5.2

PRESSURES ON FUNDAMENTAL VALUES AND VALUE ORIENTATIONS

- (1) Subject for Research: Pressures on fundamental values and value orientations in the American culture: controlling and guiding change
- (2) Requirement for Study:

A culture contains a number of characteristic conceptions of the real world and of desirable ways of acting within it, which, taken together, form a configuration characteristic of the culture. The conceptions of desirable modes, directions, and goals of acting, and of the real world in which it is meaningful, possible, and necessary to act, form the basis of the values and value orientations in the cultural configuration. (See the discussion in Florence R. Kluckhohn and Fred L. Strodtbeck, Variations in Value Orientations, Evanston, Ill.: Row, Peterson and Company, 1961, Chapter 1, "Dominant and Variant Value Orientations," pp. 1-48.) Among characteristic parts of the American cultural scheme of values and value orientations

are the assumptions that behavior can be and should be oriented to the future, that individuals can create and act to change the world, and that individuals have wide ranges of autonomy in their behavior. These assumptions are part of an activist approach to the world which is characteristic of the American cultural style and which forms a meaningful point of reference for describing it. The effects of massive attack may be felt throughout the American cultural style as well as in other behavior patternning systems of society. In order to preserve a perspective on processes of change in the American cultural style, over what may be protracted periods of reconstruction, and to develop criteria for determining what preserves and what erodes the basic cultural style, the analyst and planner will need to know in what directions the basic assumptions of the culture may tend to shift. Under the stress of massive attack, individuals may be more interdependent over longer periods than is customary in American behavior. The devastation of attack may be so great, and the time of rebuilding so lengthy, that individuals may find their faith in their ability to master the world and be actively effective within it under severe strain. Those who would analyze the long term processes of American adjustment to massive attack will want to know whether the events of massive attack will constitute an event which affects the cultural system as well as the other levels of behavior of society, and if so, the kinds and directions of effects which may alter the long term configuration of the culture and the capacities of individuals influenced by it to sustain long term adaptation and recovery efforts. If massive attack affects the basic activism of the American cultural style, this change may have profound effects on the efforts of individuals to order efforts which assume a high level of coping with the environment, especially if these efforts extend over several generations and recruit individuals who did not experience the pre-attack cultural style at first hand.

(3) Objective of Study:

(a) Central Research Topic:

Through an analysis of the assumptions characteristic of the American cultural style and configuration, and a projection of the processes which might underlie pressures toward change in the cultural system, this research will explore the possible long term changes in the frame of reference in which Americans characteristically perceive and act in the world. It may be especially useful to try to understand the ways in which the general quality of activism, and the assumptions upon which it is based, may be modified as a result of short term and long term consequences of massive attack.

(b) Research Questions:

Within the present state of the art, how can the characteristic assumptions behind the values and value orientations characteristic of the dominant American cultural configuration best be described for present purposes? How are basic styles in the dominant cultural style, such as activism, brought under pressure by the effects of massive attack? Over what times and on what levels of behavioral organization will, may, changes in the assumptions characteristic of the American cultural system be manifested? Are there minority or variant value orientations, assumptions, and

cultural styles, rooted possibly in ethnic group variations, which are more adaptive or less adaptive, more resilient or less resilient, than the dominant, widely communicated style? If the dominant cultural style is a key defining complex of the society, how will pressures toward modifying its themes in the post-attack world, possibly over several generations, suggest that basic recovery goals are not attainable? To what extent may possible short run, adaptive pressures toward enhancing the effectiveness of the dominant cultural style yield to long term surrender of the style, when a critical point in degree of stress and devastation has been exceeded? If a given cultural style is necessary or useful to adaptation and recovery, what countermeasures can be instituted to increase its probability of survival?

Study 5.3

RELIGION AS POST-ATTACK MEDIATOR AND CONTROLLER

- (1) Subject for Research: Value and organizational systems of religions as mediators and controllers of individual behavior in post-attack society

- (2) Requirement for Study:

A fundamental institutional reference for defining individual behavior in the face of uncertainty and for engaging in collective behavior is organized religion, which is both a set of assumptions and views toward the world and a way of behaving in a particular group structure. Religious institutions constitute a focus for maintaining values and coherent collective responses parallel to the secular focus, but their adaptive capabilities may not be fully appreciated until after secular institutions and organizations have been disrupted and placed under stress, as in the aftermath of a massive attack. An assessment of the effectiveness of religious attitudes, assumptions, institutions, and organizations in organizing individual behavior under stress will provide an estimate of the range of ways in which religion, as a component of both the cultural and the social systems of behavioral organization, can organize individual behavior and direct it toward adaptive ends in the post-attack situation. Such an estimate can enable the planner both to utilize and to appreciate the limits upon utilizing levels and types of individual and collective religious behavior for survival and recovery goals.

- (3) Objective of Study:

- (a) Central Research Topic:

This study should assess the ways and the ranges of ways in which religious institutions form effective controls over behavior and preservers of basic values for

individuals in the contemporary United States. On the basis of this detailed estimate of the extent of contemporary American religious commitments and/or the extent to which religious organizational activity effectively engages individuals, it may be possible to make an estimate of the conditions and limits under which religious institutions can form the center for enabling individuals to cope with attack effects, and for directing group processes of maintaining basic societal values or undertaking concrete survival and recovery tasks. This is more than a census of the various tasks which could be undertaken by religious organizations; it is also an assessment of the ways in which varieties of religious institutions, organizations, and behavior can contribute to the maintenance of values and the ordering of individual responses to continuing stress in various forms. This assessment should lead to an inventory of the ways in which religious institutions can be utilized both to maintain the coherence of social structure and value structure, and to support individual adaptive behavior.

(b) Research Questions:

In what ways do religious orientations, assumptions, attitudes, institutions, organizations, and behavior provide resources for mediating stress in post-attack society, maintaining social values and social structural coherence, and supporting individual adaptation to post-attack living? What are the characteristics of an inventory of these resources? To what extent are religious institutions less vulnerable, more vulnerable, equally vulnerable, to massive attack, when compared to secular institutions? What parts of the religious institutional sphere are relevant at what times following attack to efforts to maintain the identity and coherence of social organizations, to support individual survival, and to stimulate individual adaptive efforts? Because of the placement of religious institutions among the fundamental instruments for maintaining or defining value in society, their role in the post-attack situation may be broader than that of the voluntary associations, as this has been projected in Study 4.8, "Voluntary Associational Resources for Social Organization." To understand this role, it is important to see religious institutions as givers of meaning to events, as well as providers, in their organizational dimensions, of foci of particular social action. But note, that religious groups have been considered as voluntary associations for several of the purposes of Study 4.8.

LOSS OF RECORDS AND RECORDED CULTURE

- (1) Subject for Research: Consequences of loss of records and a recorded culture, and means for reconstruction of recorded culture and the interim meeting of needs caused by the loss of records
- (2) Requirement for Study:

The dependence of a complex society and culture upon preserved records and the means of maintaining preserved records has been recognized by a number of firms, corporations, and units of government, which have taken measures to safeguard their records from disasters. Beyond the categories of documentation which may be preserved, however, there may be additional records whose function in maintaining the coherence of behavior, social structure, and culture is crucial, even if it assumed that those categories of records now preserved were being effectively preserved by all responsible organizations. Much social history is embodied in semi-official or unofficial records, monuments, libraries, and artifacts. Many of these stores of information are in the culture overlap and thus constitute a total hoard of information which may have a relatively high degree of redundancy. Under conditions of massive destruction, such large scale destruction of information and records systems of all types may occur that the normal overlap and redundancy which could be used for reconstructing documentation are destroyed, and large hiatuses remain. The planner needs a systematic and comprehensive assessment of the kinds of information which are necessary to meet the various levels of maintaining a coherent culture, including, in the end, an effectively stored historical past for oncoming generations. He needs to know what difficulties may be encountered in reconstructing individual, group, or cultural historical records of varying criticality, from a post-attack situation where information safeguarding systems may have been only partially ready to withstand massive attack, and where the high redundancy of records and the residues of all types of communication may have been sharply reduced. He needs to be ready to meet short term needs for documentation and verification which may depend on the provision of written records.

- (3) Objective of Study:
 - (a) Central Research Topic:

From the perspectives of the historian, cultural anthropologist, and information specialist, a determination should be made of the categories and locations of information, records, and artifacts which are crucial not only to preserving individual and group capacities for directed, legitimate behavior in a complex society, but for preserving the basic institutions and sense of a coherent past in the whole society. These more general kinds of information requirements may be especially important for preserving the coherence of cultural meanings, history, and standards during long term reconstruction extending over several generations. The

expanded meanings of "critical information" and "vital records" in post-attack society should be established, and means for preserving a broad range of information or reconstructing records and information should be proposed.

(b) Research Questions:

Upon what kinds of physical records are not only the concrete actions but the institutional assumptions of complex society dependent, and to what extent are the meanings and behavior patterns of a complex society dependent upon information and information storage methods and systems that are vulnerable to massive attack? To what extent would a massive attack destroy the capacity of a complex society for keeping its history? If there is widespread destruction of physical records and artifacts from which reconstruction of records and written history of the past would normally be attempted in future time, how can oral depositions be organized and legitimized to fill the gaps? What kinds of oral depositions will be definitive, and what criteria and systems will be needed to stabilize the oral process of reconstructing vital records? What kinds of short term needs for records will arise during reconstruction, and how can they be met in ways which will be consonant with long term efforts to reconstruct physical records? Some of the problems discussed in this study also occur in Study 5.7, "Legal Resources and Restoration of Civil Life."

Study 5.7

LEGAL RESOURCES AND RESTORATION OF CIVIL LIFE

(1) Subject for Research: The legal customs, requirements, and institutional resources of post-attack American society, with special reference to the resumption of semi-autonomous civilian activity; the continuity of pre-attack governmental obligations in all levels of jurisdiction

(2) Requirement for Study:

The legal institutions of American society, including systems of adjudication, maintaining principles and precedents to define new situations, and developing and maintaining effective practitioners of the law, constitute one of the principal areas of the culture in which behavior is given coherence in the face of new situations, and conditions are set for defining changes and conflicts within a larger framework. These legal institutions exist both as active behavior and practice, and as the potentiality for constraining and directing action in the future time. They are, in elementary forms, part of the attitudes and approaches of citizens to social living, as well as a sphere of organizational and institutional practice in its own right; the familiarity with basic notions of legality and lawfulness by many citizens seems to be especially a feature of a democratic society with a common law tradition, even though these widely disseminated notions of legal procedure and substance may be sometimes more honored in their breach than in their practice. Legal institutions will represent crucial reservoirs for defining and reinstituting social and cultural order in the

post-attack world, especially when individuals are free to behave in civilian roles. Property rights, obligations of individuals to each other, matters of claim for compensation for damage and help in rebuilding, continuing obligations from the pre-attack world which governments will be constrained to honor, and tests and validations of possible short term official or quasi-official acts in the face of immediate disaster are examples of the varied issues, matters and acts which legal institutions will help to organize, decide, or enforce. The planner and administrator need to know the extent to which legal institutions will be disrupted by massive attack, and in what areas they can resume effective control at various times following attack. He needs to know the extent and kinds of post-attack carryovers of legal forms, practices, assumptions, accepted customs, bodies of formal knowledge, and organizations from pre-attack life, the new burdens they can and will have to assume in post-attack society, the kinds of ad hoc legal or quasi-legal determinations which will be compelled under the pressures of post-attack life, and the pre-attack measures which can be taken to increase the probability of the survival of effective legal institutions. He needs to know, in general, the levels at which legal institutions and practices will constitute a reservoir for organizing adaptive behavior and civil life while rendering them acceptable to and consonant with a continuing tradition of values and behavior accepted by many individuals.

(3) Objective of Study:

(a) Central Research Topic:

This study will project and describe the particular legal resources and institutional practices that will be possible and utilizable in post-attack society, during its various phases of recovery, for enabling individuals to adapt and rebuild within a continuing framework of legitimate social practices. Stresses on legal institutions and legality as a theme in the culture should be estimated for successive stages following massive attack. Requirements and needs for preserving legal institutions on their various levels should be stated.

(b) Research Questions:

How are American legal institutions and practices, and their pre-requisites, vulnerable to massive attack? To what stresses and pressures toward modification will they be subjected at various times following massive attack on the whole society, and what particular roles in helping individuals make coherent adjustments to post-attack living and rebuilding will they have? What counter-measure systems are required to insure the operation of legal processes when they are needed in post-attack society? What particular matters for legal process will tend to characterize each major post-attack time phase? At what time after attack will the forms and processes of legality need to be reinstituted? What informal practices will meet the needs met by law and legal practices in post-attack society, particularly during its early phases? How can, should, legal institutions act as a brake on the high degree of social control which may prevail in the early stages following massive attack? Can legal institutions help in shifting social life from high degrees of individual control to relative individual freedom, as the immediate social requirements for adapting to the effects of attack are met?

NUTRITIONAL NEEDS AND AMERICAN DIETARY HABITS

- (1) Subject for Research: Nutritional needs of the population during various post-attack time phases, in the context of American food and dietary practices
- (2) Requirement for Study:

It is frequently assumed that if people are hungry enough, they will lose their inhibitions about eating unfamiliar food. If sufficient stocks of basic survival food items are laid away in invulnerable positions to which individuals would have post-attack access, there is a reasonable probability that the dietary needs of the American population would be met until agricultural production could be restored. It may be naive to assume, however, that all individuals will, for sufficient lengths of time, easily ingest the survival foodstuffs that are available, particularly if these are unfamiliar. Shelter habitability studies and studies of modes of utilizing group pressures to facilitate the consumption of unfamiliar foods suggest that it is possible to induce the consumption of monotonous or less desirable foodstuffs in some situations. But the length of the post-attack recovery period and the possible long term disruption of the processes of production and consumption which distribute food may reveal certain resistances to the continued use of unfamiliar or monotonous food items. Among certain groups, particularly those groups for whom it is more difficult to adjust to post-attack living or who perceive themselves as having legitimate claims to special treatment, the unfamiliarity of the items they must consume may lead to erratic eating habits or rapid increases of the symptoms of ill health or lassitude, particularly as the tight controls of the Shock-and-Shelter Phase relax. If the planner would guarantee minimum satisfaction of nutritional needs, in order to guarantee the survival of a population base from which to sustain a long term recovery effort, he will find it important to estimate the ways both nutritional needs and American dietary habits can be satisfied in the post-attack situation--or, if the latter cannot be satisfied, how these habits can be changed or American eating behavior altered. Again, it may be sufficient to let the exigencies of hunger obviate the need for this research study, and to focus instead on providing protected nutritious foodstuffs without overly much concern for their appeal. But if the goal of survival is to preserve some individualism of style in individual behavior, and to have at the same time a healthy population capable of withstanding the emotional and physical pressures of long term reconstruction efforts, then some respect for American dietary habits and their variations will be needed in post-attack society.

(3) Objective of Study:

(a) Central Research Topic:

This is a study of the types and variations of American dietary habits which will constrain the effective consumption of likely kinds of available post-attack foodstuffs, both during conditions of maximum stress, conditions of fluctuating and protracted stress, and conditions of declining stress. Measures for adjusting available foodstuffs to these dietary habits should be considered. If such adjustment is deemed impossible or only partially possible, means of altering dietary habits should be considered, within the framework set by the twin needs of meeting physical nutritional requirements and maintaining emotional health. The issues involved in the question of whether any serious attention need be paid to dietary habits, if nutritionally adequate foodstuffs can be guaranteed, should be sorted out, to clarify the nature of the final judgments on this issue which will face the policy-maker.

(b) Research Questions:

What dietary habits or customs, for what groups of Americans, may cause resistances to the consumption of the most likely forms of post-attack foodstuffs? To what extent will pressures toward survival offset these habits, and to what extent will they have little effect on dietary habits? At what points and conditions in post-attack time are resistances to available foods likely to become manifest? To what extent will limitations in foodstuffs make these limitations a summarizing issue and target for frustrations felt about post-attack life? Are there accessible and acceptable means of changing American dietary habits, if it becomes clear that such changes would enhance the physical and emotional health of significant groups in the population? What will be the physical nutritional needs for each significant post-attack group during each major post-attack phase, especially age and occupational groups, given the conditions of post-attack life?

Study 5.9

FUNCTIONS OF RECREATION AND PLAY

(1) Subject for Research: Pressures on recreation and play, and the roles of these forms of outlet in post-attack adaptive behavior

(2) Requirement for Study:

There is, perhaps, a certain implicit comment on dominant American values in the fact that a study of the necessary functions of recreation and play is included in this group of studies. One might go even farther, and argue that there

is an assumption here that the post-attack world will be one of unremitting work and grimness, without possibilities of tension-release unless specific steps are taken to insure that there can be "recreation" and "play." The reasons for including such a study are, however, seemingly quite simple. Recreation and play are explicit, recognized patterns of behavior in the culture, governed by styles and procedures which to some extent do, and to some extent do not, depend on the placement of the individual in the social structure. Participation in these institutionalized patterns of behavior is, for many, an important form of rest and tension-release or tension-management. In short run disaster, individuals may fling themselves into bursts of activity. But during relatively long periods of relative immobilization during the Shock-and-Shield Phase, or during emergence and long term reconstruction of society, it may become necessary to encourage individuals to organize their patterns of activity into more explicitly demarcated periods of work and recreation than they are used to doing. In the shelter situation, alternating periods of work and "play" may give structure to a situation where many of the cues for organizing the day are absent. In the environment of emergence and reconstruction, the perceived tasks may be so great that individuals may need to have recreation and play thrust upon them. For some highly motivated individuals, it may be difficult to rationalize the need for recreation and play. Those who would equip individuals to make long term adaptations to post-attack living must be prepared to recognize the possible pressures on recreation and play as culture patterns. They must know how to encourage the re-emergence of the institutions of recreation and play in various post-attack situations, and how to recognize the conditions under which recreation, play, and tension-release as institutional behavior and culture pattern become crucial to maintaining the emotional health of individuals.

(3) Objective of Study:

(a) Central Research Topic:

This study will examine the pressures produced by the effects of massive attack on recreation and play in American culture and social behavior. It will be insufficient to study the functions of tension-release activities in the context of the dynamics of small groups; it will be necessary to consider the varieties of recreation and play which exist as cultural patterns and social institutions, the effects of massive attack on styles and behaviors characteristic of recreation and play, and the conditions under which it is possible and desirable to encourage various forms of recreation and play or to take concrete steps to reinstitute specific patterns of recreation and play in the post-attack situation. This may ultimately require means for calculating and justifying pre-attack and post-allocations of resources to insure the preservation of crucial patterns of recreation and play.

(b) Research Questions:

What particular forms of recreation and play as social institutions and cultural patterns will be vulnerable to the effects of massive attack? How is this vulnerability dependent on the social position of participants in these institutions? How can their functions of tension-release and tension-management be met in short

run and long run post-attack situations, under varying conditions of control on individual behavior? What problems in the re-emergence or re-assertion of recreation and play as legitimate social institutions are to be expected? To what extent should specific measures be taken to deal with these problems? What allocations of resources and management would need to be made in the post-attack society, during its various phases of recovery, to preserve the functions or the patterns and institutional forms of recreation and play? The problems considered in this study may overlap with those of Study 5.10, "Re-emergence of Popular Culture and Its Content."

Study 5.11

ECONOMIC RESOURCES FOR PRIVATE ENTERPRISE

- (1) Subject for Research: Economic resources for resuming private enterprise, and their institutional and organizational management
- (2) Requirement for Study:

"Private enterprise" remains an important institutionalized value in American society, even though the position of its classic example, the individual entrepreneur, has been subjected to substantial erosion. The organizational expression for this value now resides with increasing frequency in large, corporate activity. Although the meaning and utility of the "private enterprise" concept are the subjects of continuing debates on social and economic policy, the concept remains an important although ambiguous value in directing social activity, and it is probable that the restoration of some form of private enterprise economic system will be one of the principal goals and defining characteristics of societal recovery from massive attack. Economically relevant resources can be used to build several varieties of economic system. If a private enterprise system is a final motive guiding recovery efforts, however, it becomes important to know the extent to which the resources for such a system will survive massive attack, and if they survive only in limited forms, what will be needed to replace them. But, since these resources will be, in many cases, those resources which could be used by other forms of economic system, the really crucial question seems to be how they will be managed in the post-attack situation, and what values will govern their management. Thus, the planner and administrator need to know the institutional and organizational requirements for managing economic resources to re-establish a private enterprise system. This requires, in turn, an understanding of the pressures to which the values, institutions, and organizations for combining economic resources into a private enterprise system will be subjected to pressures for change toward other forms of economic system, and the measures required to resist these pressures.

(3) Objective of Study:

(a) Central Research Topic:

This study complements and overlaps with Study 4.13, "Restoring the Structure and Processes of the American Economy." While the emphasis of that study was upon the requirements for re-establishing the economy characteristic of a complex, industrial society, the emphasis of the present study is upon the restoration of that economy as one governed by the values of a private enterprise system. This is, then, a study of the institutional and cultural assumptions behind a private enterprise system, and the kinds of pressures which the effects of recovering from a massive attack will impose upon the values supporting a private enterprise system. It will be necessary to describe the economy with the completeness implied in Study 4.13, but it will now be necessary to determine the ways in which the effects of massive attack can pressure processes of the allocating of resources away from a private enterprise system, as that system is supported by a set of linked social values and cultural patterns. The goal of the study should be a set of requirements for managing economic resources, in full cognizance of the pressures of post-attack reconstruction, so as to support the re-emergence of a private enterprise economy. It is assumed here that great pressures toward centralized allocation of economic resources and shifting of values supporting private enterprise will exist in the short run as a result of the effects of massive attack, but it is not assumed that it is possible to "abolish" a private enterprise system, with all its supporting institutions and cultural patterns, in one massive blow. It seems more meaningful to say that shifts in the economic order may come through the accumulation of attack effects on several levels of behavioral organization.

(b) Research Questions:

What are the institutions and culture patterns governing the allocation of economic resources toward a private enterprise system which are vulnerable to massive attack? What pressures on the level of institutional and cultural systems will be created against a private enterprise system, by massive attack? What forms of more centralized economy will be imposed by the requirements for recovering from massive attack? To what extent and in what specific ways will a more centralized economy tend to be self-perpetuating? How can it be constrained to change back into a private enterprise system, during long term reconstruction? Are there particular, characteristic economic resources, or sequences in their allocation, which are required to restore a private enterprise system in an industrial society? What measures must be taken in the pre-attack and post-attack situation to support the values and behaviors of individuals and organizations which are necessary to maintaining a private enterprise economy?

CHAPTER V. STANDARD SITUATIONAL CASES: THE DEVELOPMENT OF A RESEARCH TOOL

This chapter reports on the development of a conceptual tool intended for use in programmatic research on post-attack behavioral phenomena. The purpose of the tool is to provide descriptions of a set of meaningfully distinct situations which might result from a nuclear attack on the United States. Such descriptions would be useful in two ways. First, they define the environmental contexts in which general propositions on the behavior of survivors could be formulated without the necessity of providing a large number of qualifications. Second, they provide a link between attack variables and subsequent behavioral variables, thus furnishing the logical machinery for relating specific hypothetical attacks to predicted behavioral effects.

The Requirement for a Research Tool

The Need for Boundaries on Post-attack Situations

One of the sorest problems facing the researcher of post-attack phenomena is the profusion of situations which can obtain in the post-attack world. One needs only to imagine the numerous ecological, demographic, attitudinal, and social-structural patterns existing normally in the United States to comprehend the difficulty that is encountered in trying to make valid general statements about social and psychological attack effects. This problem is further complicated by the many types of attack which must be considered.¹ The combination of varied pre-attack social patternings

¹See Chapter VII for a discussion of various types of nuclear attacks.

throughout the country with the possible variations in attack patterns, timing, weapon yields, etc., produce a multiplicity of distinctly different situations in which survivors are apt to be found. Considering that the goals of this research project are projections and predictions about human behavior in the post-attack period, then a way is clearly needed to discriminate among the distinctly different kinds of situations in which behavior is likely to occur. It is unlikely that any proposition about human behavior would be equally applicable across all possible situations. Means are needed, therefore, to describe the post-attack conditions that are likely to obtain in various situations likely to result from a nuclear attack.

The Need for Relating Attack Variables to Behavioral Effect Variables

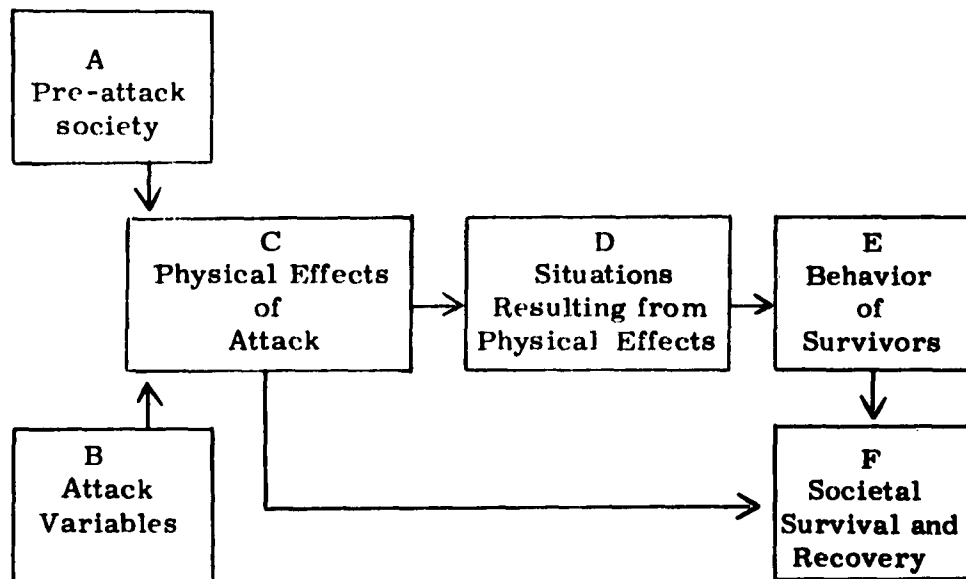
In attempting to make predictions about post-attack phenomena without reference to the types of situations fostering them, one encounters the necessity for making an inordinate number of qualifying statements which produce a total result that is nearly incomprehensible or so vague as to be doubtfully applicable to any particular circumstance. Such problems seem continuously to plague the researcher in this area of study.

A second need for situational descriptions stems from the ultimate requirement to relate particular hypothetical attacks to specific propositions about social and psychological effects in order to make inferences about societal recovery. A researcher beginning an investigation of post-attack social and psychological phenomena, ordinarily finds that in order to deal meaningfully with the host of attack and situational variables, his primary effort must be turned aside while he becomes enmeshed in a consideration of the independent variables of possible attack patterns. This is necessary first, because the phenomena under study are, of course, consequences of the attack; and, second, because any research results must be relatable to specific

attack patterns to have any applicability. The researcher's problem is represented schematically in Figure 1.

Figure V-1

SCHEMATIC REPRESENTATION OF THE VARIABLES INVOLVED IN
RESEARCH ON POST-ATTACK PHENOMENA



The immediate objective is to make predictions about the behavior of survivors (Box E). But almost any prediction the researcher might make would depend upon the particular attack assumed, and the particular post-attack situation of the segment of society he is considering. The complex difficulties encountered in trying to specify attack variables and associated physical effects for a spectrum of predictions confronts the researcher with an almost insurmountable task. And yet, if he fails to treat these independent variables adequately, his results can be of only limited value because they cannot be related to attack variables.

A Possible Solution

One solution, which appears to offer some promise, would entail specifying a set of situations which combine certain pre-attack environmental variations with local attack effects. This set of descriptions of post-attack situations would need to be rather exhaustive of the possible situations which might result from any of a wide range of hypothetical attacks. We are saying, in effect, that a set of situational cases must be considered which have sufficient comprehensiveness to serve as Box D in Figure V-1 for any attack pattern. If this could be done satisfactorily, the behavioral researcher could begin his research problems with Box D in Figure V-1 and ignore, for the time being, the variables designated by Boxes A, B, and C. His efforts could be concentrated on establishing relationships between conditions of particular situations (Box D) and behavioral variables (Box E). It then would be possible, in a quite independent effort, to determine the relationships between attack variables, pre-existing society, physical effects of an attack and the set of situations described. In a third, still independent effort, the integration of physical effects with behavioral effects could be accomplished and the relationships with the ultimate criteria of recovery defined. Such an approach would ultimately allow study of the relationships between attack variables and recovery variables. At the same time, it would permit the behavioral scientist to focus his attention on the prediction of human behavior under various situations resulting from a nuclear attack.

In sum, the suggested solution divides the total research question into three separate questions which can be pursued independently and whose results can ultimately be interrelated.

Development of a Set of Situational Descriptions

Ideally, a set of contextual referents such as these should consist of a set of cases which are small enough in number to be easily manageable, but at the same time are of sufficient number and generality to include the majority of situations which might arise from any hypothetical attack pattern. It is felt that definition of the cases must be salient to the behavioral implications of the situations; moreover, it should also provide sufficient description of the physical environment to afford correlations of the presumed effects of an hypothetical attack on any area of the United States to one or more of the cases. This last criterion must clearly be an aspect of the set; otherwise, its practical value as a tool for planning would be considerably limited. It must be determined, however, to what extent the descriptions need be relatable to the physical characteristics of an attack.

In one sense, one could hope to derive a set finely enough delineated to allow for the computation of casualty percentages, accessibility times, and the like. In another sense, one would hope, minimally, that given an area and a general outline of its environmental characteristics following an attack, one could recognize that the area fell into one or more of the standard cases. A set satisfying relatability in the first sense would clearly have to be large and so defined as to be sensitive to small gradations in the physical environment. Since the purposes at hand require that areas differing significantly with regard to the behavior and social structure of the inhabitants be distinguishable, it is felt that where compromise is necessary, it should be made by generalizing physical (damage) characteristics rather than those which are of a social structural nature. Relatability in the second sense above is, of course, desirable if not necessary for useful analysis.

Thus, the primary characteristics of the concept of standard cases demands that the set be fairly small, and at the same time that the cases be meaningfully (for the social scientist) defined and as nearly exhaustive of all eventualities as possible. These criteria imply that the descriptive terminology defining the sets will have to be somewhat general in nature, but this need not be a limitation in itself. Individual applications of this tool may necessarily require more precise delineation within cases, but the nature of these subcases will vary within the particular context of the research effort.

Suggested Parameters

The two broad areas from which we shall draw our descriptive categories are the pre-attack environment of the locale and the direct physical damage and hazards resulting from a thermonuclear attack. In the former category, the population density and general socio-economic characteristics of both the area in question and its environs are highly significant determinants of social behavior. In the latter category, the immediate blast, wind, and fire damage should be separated from the more intangible threat of radiation contamination, inasmuch as the individual's perception of these two dangers is likely to be widely dissimilar. On the following pages these categories will be more finely defined for the suggested classification system.

For distinguishing the general type of locale being considered, the usual terminology of the Bureau of Census, which classifies most general characteristics as either "urban" or "rural" is probably not sufficiently precise for our purposes. The five categories of "metropolitan center," "suburban area," "small city," "small town," and "rural area" have frequently been used and cover most of the population of the United States.

Combining the more closely related of these, three generic classifications are more explicitly defined below.

1. Metropolitan-suburban area. This term designates any union of a large, urbanized center with its largely residential fringe having a combined population of over 500,000. This area will be, in general, larger than the central city itself, but usually smaller than the Standard Metropolitan Statistical Area of the Census Bureau, since limits should be drawn primarily as functions of cultural and economic integration as well as population density. For example, one would hesitate to classify Salem, Massachusetts, as a "suburb" of Boston, though it is in the Boston SMSA. There are about 30 such areas in the United States comprising a large segment of the total population. Manufacturing is centered in these areas, and the highest degree of specialization of labor is achieved. Residential areas surrounding the metropolitan center will be classified as suburban only if they are highly integrated with and subordinate to that center.

2. Small city. A small city will be defined as any fairly independent incorporated unit which does not fall into the above category, but which has a population of over 10,000 persons. Again, the boundaries are along the limits of high population density and cultural dominance. The small city generally influences only the immediate surround, rather than large segments of the nation, and rural influence on it remains minimal, although this is somewhat greater than that exerted on the metropolitan center.

3. Rural-small town area. This category will include small units with less than 10,000 population and persons who live in the primarily agricultural areas outside towns and suburbs. There is very little

manufacturing in such locales and city influence is minimal (except as markets). Some 40% of the U. S. population fall under this classification.

Damage resulting from a nuclear blast (excluding radiation damage) is usually represented by drawing circular annuli about the point of detonation or ground zero for a specific explosion. The annuli of increasing radii determine zones of decreasing damage from thermal and blast waves, and are usually finely enough delineated to allow the computation of casualty percentages and approximations of the extent of structural damage in each area. One of the disadvantages of this method is that there is not necessarily a clear relationship between structural damage and casualty rates. Time of day, amount of warning, amount of existing shelter space, and extent of pre-attack evacuation are some of the intervening variables between these effects. Since we are primarily concerned with the effects on personnel, it is felt that a broad description of four casualty rates should suffice. A "blast casualty" here will be defined as anyone suffering injury from the blast wave, winds, or thermal effects, either directly or indirectly, to an extent causing anything from required hospitalization (normally) to death. Any area being considered, then, will be characterized as having either 0-2%, 2-15%, 15-40%, or more than 40% casualties where the numbers are used only as very loose boundaries. Obviously, some idea of structural damage can be inferred from these classifications. Areas suffering the lowest casualty rate could be expected to have suffered only minor (though possibly extensive) damage to residential-type buildings, at worst, while near devastation would be necessary to produce the higher two rates.

For characterizing radiation contamination, a simple dichotomization of whether or not the area has been covered by a dangerous level of local

fallout² should be sufficient. As shown in Chapter VI, there is very little reason to consider initial radiation as a separate threat, and too little is known of the extent or effects of global fallout to include it in our situational cases. For our purposes, we shall say that there is "no" radiation damage if the dose accumulated by 80% of the population of the area after three weeks from the last explosion is less than 200 rems, unless a dose of over 150 rems is accumulated in any period of less than three days. Otherwise, we shall admit of a radiation hazard in the area. The motivation for these limits is that the numbers correspond roughly to the noticable injury threshold. Doses less than these would rarely cause physical changes in an individual that could be discovered without medical examination, and thus, the average person would not be likely to perceive any injury.

One extremely important factor that is frequently overlooked in disaster research is the prevailing conditions in the area immediately adjacent to or surrounding the locale being investigated. In previous disasters, devastated areas have usually received critical aid from nearby communities which sustained less or no damage at all. Under a full-scale thermonuclear attack on a nation such as ours, one could expect the influence of surrounding areas to work in several ways. For a large city sustaining a direct blast, for example, the deciding variable determining whether the catastrophe became total might well be whether the less-injured surrounding area was capable of supplying critical items such as food, shelter, and medical care. On the other hand, a small town that escaped relatively unscathed might be overwhelmed by a flood of injured, hungry survivors from a nearby disaster

²The technical definitions of this and other weapons-effects terms are discussed in more detail in Chapters VI and VII.

area. Thus, at least some cognizance must be taken in our set of categories of the type of surround and the extent of damage therein. In the interests of size, these characterizations will be of a somewhat more general nature than those of the immediate area of concern and will be considered as subcases.

When the area in question is classified as rural, we shall consider only two types of surround, urban and rural, the former corresponding to the metropolitan-suburban area and small city, the latter being the rural-small town category as above. Note that "surround" as used here designates the predominant characteristic of the nearby country; thus, a large metropolitan area would be the major characteristic within about a hundred-mile radius and a small city would likely dominate the area for about forty to fifty miles. In considering a rural-small town area, then, the surround would also be rural only if there were no cities nearby.

For small cities and metropolitan-suburban areas, somewhat different classifications seem valuable. When considering these locales, the surround may be classified as predominantly "food-production" (as in the South and Mid-West), "industrial-residential" (as in the Northeast), or "other" (primarily for cities surrounded by largely unpopulated areas).

Since our interest in the surrounding area is largely a contingent one, we can classify the damage sustained there in broad terms. In the set suggested here, only the terms "damaged" and "undamaged" are used. This terminology is used to incorporate both blast and radiation damage, and is intended to be used relative to the preceding classification. Thus, a food-producing area will be damaged only if its capability to produce food is seriously impaired, while a city with a very low direct casualty rate might be considered to be "damaged" if it is heavily dependent on regular food importation and this has been curtailed. These classifications, then, are

fairly arbitrary; and, it is intended that they be developed more specifically in the context of the particular problem being considered.

The complete set of situational cases following these definitions is presented in Figure V-2, where it will be noted that there is a large number of meaningful combinations of factors. Indeed, the set of cases may seem large at first glance, but it is clear that an individual research project would seldom require detailed investigation of each of the subcases at great length. Certain of the situations would obtain only rarely, and others might best be considered concurrently depending on the phenomena being studied. On the other hand, one can imagine contexts in which it would be desirable to delineate more finely certain topically relevant problem areas. Such finer distinctions are best left up to the individual researcher.

Figure V-2
A SUGGESTED SET OF STANDARD SITUATIONAL CASES
(see text for definitions)

TYPE OF AREA	BLAST CASUALTIES ¹	RADIATION HAZARD ²	CASE NUMBER	SUBCASES Condition of Nearby Area ³
Rural, small town	0-2%	no ⁴	R1.0	(a) undamaged rural (b) damaged rural (c) undamaged urban ⁵ (d) damaged urban (e) other ⁶
		yes	R1.1	
	2-15%	no	R2.0	
		yes	R2.1	
	15-40%	no	R3.0	
		yes	R3.1	
	40-100%	yes	R4.1	
Small city	0-2%	no	C1.0	(a) undamaged food-production (b) damaged food-production (c) undamaged urban ⁷ (d) damaged urban (e) other
		yes	C1.1	
	2-15%	no	C2.0	
		yes	C2.1	
	15-40%	no	C3.0	
		yes	C3.1	
	40-100%	yes	C4.1	
Metro-politan & Sub ⁹ urban	0-2%	no	M1.0	(a) undamaged food-production (b) damaged food-production (c) undamaged industrial-residential ⁸ (d) damaged industrial-residential (e) other
		yes	M1.1	
	2-15%	no	M2.0	
		yes	M2.1	
	15-40%	no	M3.0	
		yes	M3.1	
	40-100%	yes	M4.1	

1. From blast, wind, and fire

2. From local fallout only

3. A generic, relative description

4. Even here, rumor of radiation might be dangerous

5. Large military installations might be classified as "urban" areas in a largely rural locale

6. Unpopulated area is special case

7. Mostly cities around; e.g., New England

8. Primarily industrial areas included, as around Hartford

9. Note that one would not likely put an entire metropolitan-suburban complex in only one category; thus, a large, isolated detonation in Manhattan would give, in the New York SMSA, classifications ranging from M4.1(d) downtown to, M2.1(d) in Queens, to R2.0(b) in upstate New York

Uses and Limitations of the Cases

Examples of Specific Applications

Several possibly valuable applications of a set of standard situational cases are immediately obvious. The major need that generated our construction of a set was for contextual referents to allow hypothesis formulation on a standard basis of postulates. The serious researcher sees the need for firmly defining the environmental conditions underlying his projections on post-attack behavior, but if investigators use different or even incommensurable bases for their predictions, it becomes difficult to integrate their results in any systematic way. The use of elements in this set as part (but not necessarily all) of the antecedents of "if..., then..." hypotheses would help to ease the integration problem considerably.

In conjunction with this application, the set provides a convenient pattern for organizing the results of research papers which are programmatic in form, or which trace the potentiality of occurrence of some behavioral phenomenon through various contingencies. For example, a researcher looking into the possibility of uncontrolled, post-attack evacuation might conclude (this is purely conjectural) that this is likely to present a serious problem in only two generic areas, say M4. and C4. (city areas sustaining almost devastating blast damage) and Rn. 1 (rural areas with a radiation hazard). He might further project that the potentiality for such evacuation will increase with the (a) subcases of all areas (undamaged rural surround), as well as with repeated attacks (a factor not included in our set of classifications) and with higher intensities of radiation contamination. Such organization of results would facilitate comparisons between findings to a great extent.

Another, somewhat similar application of the Standard Situational Cases might be their use as classificatory devices for existing disaster literature. A major problem in predicting the character of the post-attack world is in determining the relevance of studies on previous, non-nuclear disasters. The San Angelo tornado disaster, for example, could be conceived as being similar to the R2.0(a) situation, and some of the Mississippi valley flood disasters might be seen as similar, from certain points of view, to R1.1(b) or C1.1(b) conditions. By so characterizing the disaster literature (keeping in mind whatever phenomena are being studied), projections of their behavioral results to the nuclear situation may be partially clarified.

Still another potential value of a set such as this (though probably a somewhat more detailed one) would be its use, or the use of some subset of it, as a basis for a space of severity, threat level, or probability vectors. Such an application was approached in the above example on mass evacuation in which a possible result was an hypothesis of enhanced probability of evacuation with increasing radiation contamination. Similarly, one might hypothesize that conditions fostering panic increase with population density (from the R up through the M cases) and also, within these cases, with increasing blast damage (levels X1-X4). Such hypotheses would be of a very general nature, and there might be question of their usefulness at the present state-of-the-art, but the concept clearly presents potential usefulness here.

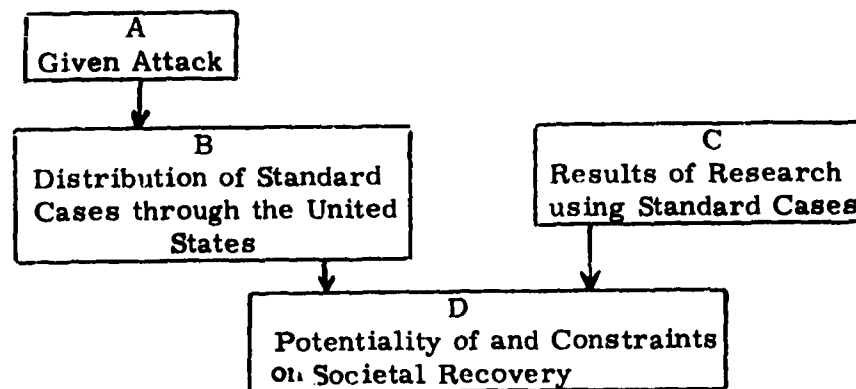
As mentioned previously, the derivation and use of such a standard set of cases breaks the research problem of societal recovery into three separate, though interrelated, steps; that is, of determining the links between attack patterns and the cases, between the cases and their behavioral consequences, and between all of these and the resulting question as to the

potentiality of society to survive and recover from any specific nuclear attack. (See Figure V-3). The first problem is a largely mechanical one of developing methods by which, given a particular hypothetical attack on the United States, (Box A in the figure) one can derive the distribution of our standard cases throughout the nation (Box B). Since a number of methods have been developed for predicting the physical consequences of an attack, most notably the computer programs of the National Resources Evaluation Center, all that remains is a close investigation of the pre-attack environments, under the standard categorizations in the country, to apply these physical data to them.

Given a distribution of cases in the country, then, a method may be derived for using the results of individual studies on the behavioral implications of the standard situations (Box C) to further derive firm predictions of the probability of and constraints to ultimate societal recovery (however defined) from the given attack. Since such a method will necessarily be to a large extent contingent on the type of findings in the individual studies, it will not be developed further here.

Figure V-3

REPRESENTATION OF RECOVERY PREDICTIONS



Limitations of the Set and Concept

It is almost certain that the reader will have noted at this point a number of shortcomings, both in the set of standard situational cases as presented here and in the concept of such a classification system in general. First, it should be pointed out that the Standard Situational Case is not derived as a panacea for all the classificatory problems in general, nor does it pretend to be a complete, consistent, or even mutually exclusive set of basic elements for post-attack research. Further, the set should not be interpreted as an attempt to channel the conceptual processes of the behavioral scientist working in the field into stagnant, inflexible categories. Quite the contrary, the concept of a standard set of references is presented largely as an organizational device to ease the problems of the individual researcher in qualifying his findings and expedite the comparison and integration of various research results in the field.

The set as presented is limited seriously in two ways. As was pointed out, the constraint of size has forced the development of a small set of very general and loosely-defined categories, the result being that nearly any specific research effort would necessitate not only sharpening the definitions, but further stratification of categories into, for example, ethnic or economic classes. This of itself does not pose much of a problem, as such is necessary at any rate, and a broad cut has been taken already by this general set thereby reducing the task of classification somewhat. The second and far more serious shortcomings is that the set, as it stands, may be too specific for some purposes. One could conceive numerous examples of phenomena which would be in evidence, not in one or two of the standard cases, but in a very small segment of each of them--say among

members of some religious or racial group scattered through all categories. Here, the classification system breaks down; it is founded on irrelevant or less than critical indices of social behavior altogether to be of any help at all for study of such phenomena.

Clearly, these two limitations work at cross-purposes; any attempt to alleviate the former by further categorization will necessarily enhance the likelihood of specific studies finding the set inapplicable to their particular research effort. Since some compromise must be made on this matter, the present set is presented as an example of the concept. We do not feel that development of the notions represented here are complete in any way. Hopefully, however, it is useful as it stands, and it claims no more. Further development is called for to overcome the known limitations and others as yet unrecognized, after which, it is hoped, a truly standard set of cases of wider applicability and with greater value as a systematizing agent may be drafted.

PART II
PHYSICAL EFFECTS OF NUCLEAR ATTACKS

CHAPTER VI. PHYSICAL EFFECTS OF NUCLEAR EXPLOSIONS

At least a general familiarity with the physical phenomena associated with nuclear and thermonuclear detonations is prerequisite to any research on the behavioral aspects of nuclear war. This chapter presents a brief, non-technical description of these phenomena and indicates sources from which the reader may obtain more detailed information as necessary. Though some may be apparent or implied, no social or psychological implications of these physical phenomena are discussed in this chapter.

A distinction should be made between individual nuclear explosions and a wide-spread nuclear attack. The present chapter deals exclusively with the effects of isolated detonations. The implications of a full attack which would involve detonations over a large area and, perhaps, over a period of time, present problems of a different character which are discussed in the following chapter.

The Weapon

In a chemical or "conventional" explosion, energy is released by a change in the molecular structure of the explosive material. Most of this liberated energy is used to convert the explosive into a super-heated gas, which attempts to occupy a volume far larger than did the original solid or liquid explosive. This gas exerts high pressures on the surround, forming a rapidly expanding sphere of pressure, commonly known as a "blast" or "shock" wave. It is this wave of high pressure which is usually the major cause of damage from chemical explosions. The damage caused by increasing temperatures in the vicinity of the detonation is usually relatively minor.

Nuclear explosions are radically different, both in cause and effect. To explode a fission bomb, the nuclei of the atoms of certain heavy elements are bombarded with a free nucleus causing them to split into smaller nuclei. The splitting of these nuclei releases a vast amount of energy in the form of fission products (smaller nuclei and energy waves) and heat. This heat, by far the major portion of the liberated energy, raises the surrounding air to extremely high temperatures forming a conventional blast wave. To call this blast wave "conventional," however, is to overlook the magnitude of a fission explosion; one pound of uranium-235, if fully fissioned, would release as much energy as 8000 tons of TNT.

The detonation of an H-bomb, or thermonuclear bomb, involves the somewhat more complex process of fusion. Here, high temperatures cause light nuclei to fuse together forming the nucleus of a heavier element and also releasing energy. The complexity of this process can best be illustrated by example. In a deuterium device, in which the central element is an isotope of hydrogen, a temperature of tens of millions of degrees Fahrenheit is required to trigger the process. This can be achieved by using a fission bomb to start. The resulting fusion produces helium-3, which in turn can also fuse with deuterium. The complete fusion of one pound of deuterium and its product produces approximately the explosive power of 26,000 tons of TNT. Further, the process also releases neutrons of sufficiently high energy to cause fission in uranium-238 (a far more common isotope than uranium-235). Thus, an extremely powerful weapon can be constructed by making use of a fission-fusion-fission cycle.

The power or energy of a nuclear device is usually expressed in terms of the amount of TNT which would be required to produce equivalent explosive power. A one kiloton (KT) bomb thus releases energy equivalent to

1000 tons of TNT; a one megaton (MT) bomb releases the energy equivalent to one million tons of TNT. The devices detonated at Hiroshima and Nagasaki were small by today's standards being in the 20-kiloton range. In 1962, the Soviet Union exploded a device of over 70 megatons.

Chronology of a Nuclear Detonation

The actual explosion of a nuclear device lasts less than a millionth of a second. The spectacular effects of the explosion, however, continue for some time. For purposes of illustration, the history of a detonation of a one-megaton bomb near the surface of the earth is presented here.

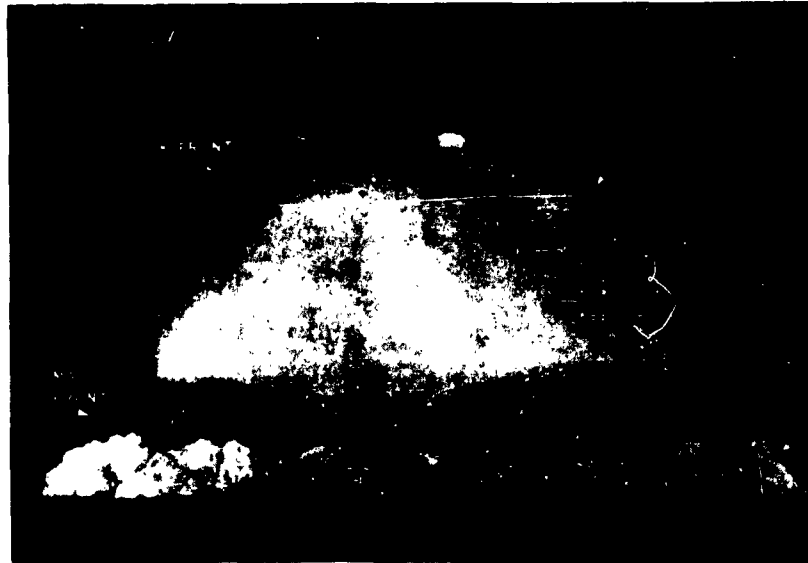
As the explosion occurs, the weapon itself and a great amount of the earth beneath it (perhaps 4000 tons) is vaporized. The weapon residues, heated to many tens of millions of degrees, emit vast quantities of energy largely in the form of X-rays, which are rapidly absorbed in the surrounding air creating an intensely hot and luminous spherical ball of gas. After about a thousandth of a second, this fireball appears many times brighter than the noonday sun to an observer 50 miles away. During this time, neutrons and gamma rays are being emitted (the so-called initial radiation) and initial thermal radiation has caused the formation of a shock wave as in a conventional explosion. At about this time, a second pulse of heat is emitted which travels at the speed of light and is intense enough to cause burns on exposed skin over 12 miles away. This pulse of heat will last for about ten seconds.

After about a half-second, the fireball is over 400 feet in diameter and is rising at a rate of several hundred miles an hour. The shock wave has broken away from the fireball and has blended with its reflection from the ground to form a "mach front " nearly doubling the

effective overpressure¹ accompanying it (see Figure 1). After about ten seconds, the fireball has reached its maximum diameter of over 7000 feet and is rising at a rate of about 300 feet per second. It is by this time roughly toroidal in shape and undergoing violent internal circulation which is sucking air and debris up into it. By now, the shock wave has traveled three miles; it carries overpressures of some 5 pounds per square inch (sufficient to demolish most residential homes) and winds of about 180 miles per hour.

Figure VI-1

THE FAINTLY LUMINOUS SHOCK WAVE SEEN JUST AHEAD
OF THE FIREBALL SHORTLY AFTER DETONATION²



¹"Overpressure" is defined as the increase in pressure over normal atmospheric pressure manifested in a blast wave. As used in this report, it will usually refer to the "peak overpressure," which generally accompanies the arrival of the blast wave.

²All figures in this chapter are taken from The Effects of Nuclear Weapons. Department of Defense. Washington, D. C.: U. S. Government Printing Office, 1962.

After 50 seconds, the fireball is no longer luminous, but continues to rise sucking air up beneath it and causing afterwinds to blow back in toward the point of detonation. The shock wave is now some 12 miles out and still traveling faster than the speed of sound.

After about 10 minutes, the fireball has changed into a cloud of condensed water and debris, some of which, highly radioactive, is dropping back to the earth. It is now at an altitude of some 75,000 feet, and has spread out into the familiar mushroom shape. It may be visible for over an hour as it moves downwind, and falling debris may contaminate an area of several thousand square miles with a dangerous level of radioactivity.

Innumerable fires over a wide area, started when combustibles ignited under the influence of the second thermal wave and by falling wires and overturning fires, may now be joining to form a "firestorm," though such a phenomenon does not always occur. The crater left at the point of detonation is from a quarter to a half-mile in diameter and is at least 260 feet deep, deep enough to penetrate most subway systems.

The foregoing description is intended to give the reader a feel for the magnitudes involved. The figures are specifically for a one-megaton surface burst, and can be quite different for other situations. Many factors influence the effects of a nuclear explosion. Some of these are as follows:

1. Energy Yield of the Weapon. As noted before, devices have been produced over a wide range of power, from less than one kiloton to the many megaton range. A simple rule of thumb is that most physical effects of bombs vary as the cube root of the yield. That is to say that an eight-fold increase in power will double the violence of most effects. This rule does not hold for many destructive effects, however.

2. Altitude of Burst. The so-called surface burst has just been described. This is defined as a burst at an altitude so low that the fireball touches the surface of the earth. At higher altitudes, a nuclear detonation, called air burst, has a considerably different effect. Here, no energy is expended in vaporizing soil or other material in the area and less of the shock wave and thermal radiation is immediately absorbed by the ground. Also, the geometry of the situation shows that there is less blocking of shock and radiation effects by hills, artifacts, etc. Consequently, an air burst will produce blast damage and fire hazards over a far wider area than a surface burst of the same yield. On the other hand, the fallout threat is not nearly so great in this case, as relatively little debris is carried up into the fireball. For bursts at very high altitudes, the only fallout comes from the weapon residues themselves, which can condense in water vapor. Underwater and underground bursts will not be considered here.

3. Time of Burst. The only physical effect that varies with the time of detonation is world-wide fallout, the patterns of which change with the seasons. Obviously, however, the time of day can be considerably important for a detonation over a metropolitan area as the downtown population fluctuates with time.

4. Weather. Thermal radiation travels similarly to light waves, and can be significantly attenuated by such phenomena as rain and fog. Rain can also, of course, affect the threat of fire spread.

5. Terrain. Intervening hills and artifacts can block thermal and initial radiation and alter the characteristics of the blast wave. Thus, a ridge running through Nagasaki protected a large area of that city from the immediate effects of the detonation and also curtailed fire spread. A large

hill, however, does not necessarily protect one from the blast wave, as it can turn around such obstacles. The presence of many buildings has a double effect in that (a) buildings will tend to shield one another, but (b) multiple reflections of the blast wave can cause a manifold increase in the resulting pressures.

The magnitude of the effects of changing these factors might be illustrated by an example different from the one used previously in describing the chronological history of an explosion. For the purposes of illustration, let us place a hypothetical observer at several distances from a burst at "optimal" (for blast effects) altitude of a 20-megaton bomb on a clear day and watch the effects chronologically. (the previous example was 1-megaton.)

At 3 miles from ground zero (the point directly under the explosion), the hypothetical observer would first be aware of a blinding flash of light, followed almost instantaneously by a blast of heat of several thousand degrees, the total accumulation of heat being some 2000 calories per square centimeter of exposed surface (sufficient to cause some melting of steel). The initial radiation at this point, however, is negligible. About eight seconds later, the blast wave arrives carrying pressures of some 44 pounds per square inch above normal atmospheric pressure (at the Nevada test site, an automobile enduring overpressures of 30 pounds per square inch (psi) was demolished so completely that only one wheel and part of an axle were found later). This pressure will remain above normal for about four seconds. Accompanying the blast wave will be winds of some 1300 miles per hour. The reader will see that there would be very little chance for survival at this exposed location.

At 10 miles from ground zero, the observer would be in a very different environment. Here, the flash would be accompanied by a thermal emission of about 150 calories per square centimeter (still sufficient to cause severe burns and ignite any substance normally considered to be combustible). The blast wave would reach the observer about 40 seconds after the flash, would raise the pressure by about 6 1/2 psi (sufficient to demolish most residential and industrial structures), would last for nearly nine seconds and would be followed by winds of 200 mph, which would extinguish many of the fires. If the observer happened to be looking at the

fireball, even at this distance, he would probably be blinded. At this location, chances of survival for an exposed individual would be slim, though taking advantage of the 40-second interlude to take any sort of cover would increase them considerably. An exposed individual here would be thrown about violently, attaining a velocity of over 50 feet per second, and shards of window glass would attain velocities of over 300 feet per second, penetrating flesh and causing severe cuts.

Even at 20 miles from the burst, the heat wave would be strong enough to ignite most combustibles and to cause second and third degree burns. The blast wave would not reach the area for some 80 seconds, but would last for above eleven seconds, cause overpressures of 2.4 psi (enough to cause extensive, though minor, damage to most structures), and be followed by winds of hurricane force. Even here, blast damage alone would cause some deaths, and, should resulting fires begin to spread, the destruction could be virtually complete.

Forty miles from the blast, our observer would be in a far better position. If he were looking directly at the fireball, he might still be temporarily blinded, however, as even at that distance, it would be several times brighter than the sun. The thermal radiation would cause no damage, but would be perceptible on a cool day. The blast wave would not reach this area for nearly three minutes, but even then would involve an overpressure of nearly 1 psi and winds of about 35 mph, breaking a few windows and thereby possibly causing some minor injury. Here, at last, our observer in the open is fairly safe, barring fallout and extensive fire spread. But it can now be noted that at least some direct effects of such a detonation can be felt over an area of over 5000 square miles.

Physical Effects on Personnel

It should be fairly apparent from the preceding discussion that a nuclear detonation would have profound physical effects on persons in the vicinity. The direct bomb effects which are capable of injuring or killing human beings are in chronological order: initial radiation, thermal

radiation, the blast wave, fire spread and fallout. These topics will be considered briefly.

Initial Radiation. It is now well known that exposure to radiations, such as X-rays, alpha and beta particles and gamma rays can have a deleterious effect on living organisms. Radiation injury seems to be caused by ionization and excitation in the individual cells, which breaks the chromosomes, swells the nucleus and increases the viscosity of cell fluids and the permeability of cell membranes. In addition, cellular division is retarded and products of the ionization itself may be toxic. The effect of nuclear radiation on human beings depends both on the amount of radiation absorbed and the rate at which it is absorbed. The unit usually used to measure a dose of radiation is the "rem" (roentgen equivalent mammal), which provides a measure of both the amount of radiation and the biological effectiveness of the dose (which depends largely on the source). A dose of 1000 rems in a single 24-hour period would almost certainly be fatal; spread over a lifetime, however, such a dose would probably produce no easily observable changes.

About 5% of the energy released in a nuclear detonation is in the form of so-called initial nuclear radiation, primarily gamma rays and energetic neutrons. These have the capability of traveling great distances and penetrating a considerable thickness of material, and caused or contributed to a great number of casualties at Hiroshima and Nagasaki. With the advent of the more powerful weapons of today, however, the danger from initial radiation has diminished considerably. With the explosion of a 1-megaton device, for example, only unshielded persons within 3000 yards of the point of detonation would be subjected to more than a 100 rem dose, which is approximately the injury threshold. Since a person in such a position would also be subjected to an overpressure of about 20 psi, winds of nearly

500 mph and about 400 calories/square centimeter, any one of which could be sufficient to cause death, initial radiation could, for the most part, be ignored. Some of the initial radiation will remain for a time after the explosion, but, again, this would be overshadowed by the later accumulation of local fallout.

Thermal Radiation. Another peculiarity of nuclear explosions is the great amount of heat that is released. Some 35% of the energy released is in the form of thermal radiation. The vast wave of heat emitted a few thousandths of a second after the detonation travels at the speed of light and can cause widespread damage and injury. It has been estimated that some 20 to 30 percent of the fatalities in the Japanese explosions were due to flash burns. A ten-megaton detonation, for example, is capable of causing second degree burns on exposed skin over 25 miles away.

A great number of variables go into the determination of an individual's susceptibility to flash burns; the yield of the weapon, the individual's slant range from the explosion, whether he is directly exposed to the flash, the amount of exposed or lightly-covered skin, and the condition of the atmosphere. The severity of a burn injury is a function not only of the amount of heat encountered, but of the duration of the absorption. The large bombs of today not only release a vast amount of heat, but the wave of heat lasts for several seconds (30 seconds of thermal emission for a 10-megaton weapon), thus increasing the probability of severe burns and ignition of clothing. Flash burns in Japan were almost entirely confined to exposed or thinly and tightly-covered parts of the body, but such might not be the case with larger weapons. Persons not in line-of-sight with the fireball, however, would probably be relatively unaffected. For a surface blast, this would be the situation for most people. A high altitude burst, on the other hand, would cover a large area with a blanket of heat. This,

coupled with the tendency of people to look up at a flash, could make thermal radiation one of the more hazardous aspects of such a detonation.

The Blast Wave. About half of the energy of a nuclear explosion goes into the formation of the powerful blast wave. This is perhaps the most violent and obvious facet of the explosion. Among Japanese survivors, some 70% suffered mechanical injuries from the blast wave. That these were primarily minor in nature is not entirely meaningful, since an undetermined number of those suffering blast injuries were trapped in the subsequent fires. Blast injuries may be divided into two categories, direct injuries resulting from the high pressures of the blast wave and indirect injuries resulting from contact between bodies displaced by the wave and accompanying winds. Of these, the latter appears to be the more profound. The human body has remarkable resistance to high pressures. The injuries caused by violent compression and decompression occur mainly at junctions between tissue and air-containing organs or tissues of different density. The usual results are hemorrhage and rupture of organs. If the damage is sufficiently severe, air reaches the veins and death occurs rapidly from embolic obstruction of the vessels of the heart or brain. The number of ruptured eardrums at Hiroshima and Nagasaki was surprisingly low, almost no cases being observed among survivors further than two-thirds of a mile from ground zero.

Tests by White & Richmond (43) have demonstrated that three factors influence the extent of injury caused by direct blast effects, namely, the rate of pressure rise, the peak overpressure attained, and the duration of the positive phase of overpressure. For bursts at a low altitude, a precursor wave may precede the major blast wave, thus lowering the probability of severe injury, but in general, the rate of rise is so rapid and the duration so long (for explosions of over 10 kt) that the major factor is peak overpressure. Tests have indicated, however, the probability of death in

humans is only about .01 for overpressures of 35 psi or less. Since, for any nuclear blast, such overpressures obtain at areas also suffering, for example, winds of several hundred miles an hour, it may be seen that the probability of death by other causes is considerably higher. Substantial direct blast injury can occur, however, at overpressures undergoing reflection from a base of 6 or 7 psi; thus direct blast injury can be a complicating factor.

Indirect blast injury is a far greater problem. Blast waves accompanied by overpressures of more than 4 or 5 psi will severely damage many structures, toss vehicles about, and fill the air with glass shards and other debris. In addition, humans themselves may be thrown considerable distances, causing injury to themselves and others. Therefore, the danger of being struck by missiles or being trapped in falling buildings (which may later burn or become dangerously irradiated) is one of the most severe anti-personnel effects of a nuclear blast. Even in relatively enclosed areas, high pressures leaking in can throw small objects about violently. Glass fragments from shattered windows may attain dangerous velocities many miles from a high-yield detonation and cause widespread injury. In the many-windowed American structures of today, flying glass could be a prime cause of injury. A great deal of experimentation has been done on indirect blast injury. The reader is referred to (4) and (32).

Fire Spread. Another effect of nuclear weapons is the potentiality, however unpredictable, that the small fires almost invariably started by the thermal wave and blast damage to power and gas lines and existing fires in furnaces, etc. might combine into firestorms or conflagrations. A fire-storm occurs under certain conditions when sufficient fuel is available for a fire to encircle a combustible area, and a mass of fresh air is drawn, sometimes at hurricane velocities, into the already burning area. Almost

incredible temperatures and updrafts can result. The firestorm at Hiroshima undoubtedly consumed thousands of otherwise nonseverely injured persons, but no firestorm occurred at Nagasaki. A conflagration, on the other hand, is characterized by a massive wall of flames, roaring leeward, which continues until out of fuel (33). Either type of fire is difficult to control in the best of conditions. After a nuclear attack on a city in which much firefighting equipment would be destroyed and access lanes blocked by debris, such fires, if started, may rage unabated for some time. It has been pointed out that the conflagration can be even more destructive than the more frequently considered firestorm. In either case, death results from suffocation, heatstroke, internal or external burns, and can occur quite unexpectedly to persons seemingly safe in underground shelters when the air becomes superheated or even nonexistent.

It has been noted previously that, on a clear day, a 20 MT airburst might ignite combustibles for over 1000 square miles; since the largest forest fire recorded in the United States in recent times burned out less than 500 square miles, it is difficult to predict the full consequences of such an event. It should be pointed out, however, that under certain conditions of weather, terrain, and lack of fuel, the individual fires might not join to form mass fires. The reader is referred to (33).

Fallout. The last dangerous direct effect of a nuclear detonation is perhaps the most feared and misunderstood one, probably because of its unfamiliar and seemingly intangible nature. There was hope in recent years that the development of so-called "clean" fusion devices would eliminate or at least limit the danger of fallout. Largely for economical reasons, however, the later-developed weapons make use of the aforementioned fission-fusion-fission cycle, some 50% of the resulting energy being released from the "dirty" fission process. In the bombs of today,

about 10% of the energy released is in the form of residual nuclear radiation. Highly radioactive weapon residues rise to high altitudes in the fireball. In a surface or low altitude burst, thousands of tons of dirt and debris also rise, and when the particles condense, the cloud is full of minute debris that is dangerously radioactive. Much of this debris (the larger particles) falls back to earth in the general vicinity of the detonation, and much of the remainder follows the cloud for miles downwind slowly falling to the earth to irradiate what may be many thousands of square miles of the earth's surface in what is known as early or local fallout. A small percentage remains in the stratosphere to circulate about the earth for months or years before falling in what is known as long-term or global fallout. Both types of fallout are potentially dangerous and will be discussed separately.

The Radiation Syndrome. A great deal has been learned of the various aspects of radiation sickness from the three bursts which caused direct injury and from scattered industrial accidents (see, for example, 1, 6-8, 9, 10, 11, 13, 24, 29, 30, 41). The major biological effects and definition of dose were discussed briefly under "initial radiation." We delineate here the symptoms accompanying various levels of whole body irradiation.

Doses of less than 100 rems should produce no external symptoms at all. Some changes in the blood structure may occur for doses of between 50 and 100 rems, but disabling sickness does not occur.

The injury threshold is between 100 and 200 rems. Such doses will generally cause some sickness but will rarely be fatal unless complicated by other injuries. There may be some nausea and fatigue on the first day or two following irradiation, followed by a latent period of about two weeks, during which significant changes in the blood are occurring. Some progress is being made in treatment of radiation sickness at this level.

At about 200 rems exposure the picture changes rapidly until at about 1000 rems, chances for survival are very poor. The first symptoms are the same as for lower levels of contamination; nausea, vomiting, diarrhea, loss of appetite, and malaise. In general, the larger the dose, the sooner the symptoms appear, sometimes within a few moments of exposure. After a day or two, the symptoms disappear for a period of up to two weeks, followed by a general relapse, accompanied by rising temperature. Two or three weeks after exposure there is a marked tendency toward internal hemorrhaging, and small petechiae under the skin may be observed. There may also be loss of hair after about two weeks. The severe changes in the blood also increase the susceptibility to infection of lesions, which can be a serious complicating factor.

For doses between 1000 and 5000 rems, the gastrointestinal symptoms are severe, culminating in prostration, diarrhea, and anorexia. After a latent period of a few days, the symptoms reappear, often accompanied by coma or delirium, and terminating in death within two weeks. Over 5000 rems produce prompt changes in the central nervous system, resulting in hyperexcitability, ataxia, respiratory distress, and intermittent stupor. There is almost immediate incapacitation and death within a few hours to a week.

These are the short-term effects of whole-body irradiation. The longer-term effects are not nearly so well known. There is some evidence to the effect that irradiation results in a decreased life span, but definitive results have not been obtained. Genetic effects are even more difficult to evaluate. The laws of genetic mutation are clear, and would indicate a lower fertility rate ramifying through successive generations. Studies of survivors of the Japanese explosions are sparse, however, and difficult to evaluate. There is also evidence of an increase in the incidence of bone cancer and leukemia, but again, the findings are not definitive.

Local Fallout. Local fallout is caused by the falling of radioactive particles from the nuclear cloud as it moves downwind, and contaminates the ground in an irregular pattern that is difficult to predict in other than statistical terms. The pattern is determined by many factors, some of which are particle size, blast altitude, wind direction, speed, shear, and weapon yield. A high-altitude burst produces little local fallout, but with bursts at very low altitudes, fallout can be one of the more dangerous effects.

Though some observers have seen a fall of white powder and some persons at Hiroshima saw an oily rainfall, in general, fallout may accompany normal-looking rainfalls or be on particles so small that they are not noticed or recognized as they fall, though the accumulation on flat surfaces should be apparent at dangerous levels. The three radioactive products, alpha and beta particles and gamma rays vary considerably in the danger they represent. The particles are heavy and are stopped by nearly any shielding, though beta particles can cause bad burns if left on exposed skin. Inside the body, however, through breathing, eating or drinking, they can pose a serious threat. Gamma rays, on the other hand, can penetrate a great deal of shielding and thus present the greatest problem. Fortunately, most of the products of a nuclear explosion which fall as local fallout decay rapidly and, except in very heavily contaminated areas, are relatively harmless after a few weeks. Two products in particular, however, Strontium-90 and Cesium-137, are quite long-lived, and mix readily with certain organic tissues. Strontium-90, for example, is a beta particle emitter and can be absorbed by plants and animals which serve as food. Similar to calcium in structure, it can then be deposited in human bones, where it can give rise to blood cancer or leukemia (21).

Even minimal shielding can afford a high level of protection in most areas contaminated by local fallout (12, 26, 36, 20). Further, fallout

accumulates in a visible layer of dust, ashes, and mud, and can be removed by sweeping and washing. Even foodstuffs are generally rendered safe by washing, unless, of course, such products as Strontium-90 have been taken inside them through the roots or when eating. Water presents a different problem. Standing water in a contaminated area would not be safe, and boiling would not render it so. Water enclosed in tanks, pipes or deep wells, however, should be harmless (15, 16, 37, 23).

Global Fallout. Some 20% of the residual radiation from a nuclear blast remains in the stratosphere for weeks, months, or even years, and therefore may circulate for thousands of miles before falling or being washed back to earth. Stratospheric wind patterns are fairly predictable (11, 13), and indicate that particles will tend to stay in the northern hemisphere for low altitude detonations there, but particles are likely to fall anywhere in that area. Global fallout patterns observed after the several nuclear test series seem to substantiate this hypothesis. The threat from global fallout, which stems largely from the long-lived radioactive particles, is the seat of great controversy at the present time. Estimates of the danger from present levels have ranged from 100,000 deaths per superbomb (35) to being about as dangerous as being an ounce overweight (39). At any rate, the threat from global fallout resulting from a fullscale war, in which hundreds of "superbombs" might be detonated almost simultaneously, it is safe to say, would be significant; how significant is unknown.

Other Physical Effects

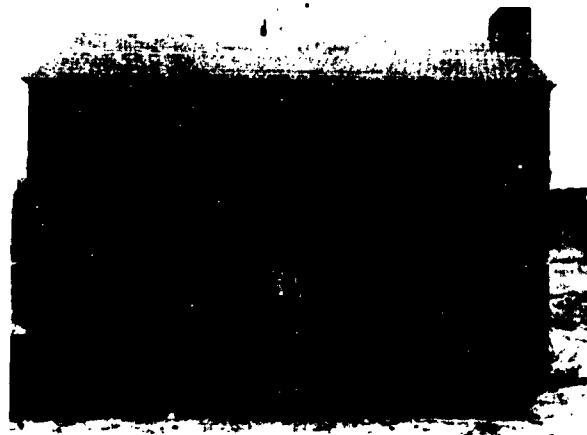
Structures. Nuclear explosions wreak great damage on such artifacts as homes, office and apartment buildings, and industrial structures. The blast wave from a large detonation may be several thousand feet thick, engulfing entire buildings and crushing them as with a giant fist. The

thermal wave, especially with the extended duration of heat resulting from large blasts, can ignite frame structures and combustible materials in normally "fireproof" buildings. Many of these smaller flames may be extinguished by the subsequent blast wave, but this may also start electrical and gas fires, and also spread fires from furnaces and stoves. These fires may then join into mass fires that can consume all combustibles over an area of hundreds of square miles. Finally, residual radiation from fallout can render otherwise undamaged or repairable structures inaccessible for several weeks, barring extensive decontamination procedures.

Examinations of structural characteristics of buildings in Hiroshima and Nagasaki and tests of the Nevada proving grounds in the United States have resulted in a fairly clear picture of the types of destruction one might expect. Though it is frequently stated that the types of construction prevalent in Japan are more prone to blast damage than those in the United States, this has been disputed. Many of the larger buildings in those cities were built to withstand earthquakes, and probably fared better than would their counterparts in the United States. On the other hand, buildings in dense city areas may tend to shield one another to some extent, so the results of tests on isolated buildings in the Nevada desert may not be entirely applicable.

1. Residences. Tests at Nevada indicated that most frame houses, strengthened or not, would be demolished by overpressures of more than 4 psi. Extensive damage to such structures, such as cracked floor joists, resulted at overpressures down to 1.7 psi. An unreinforced brick house and a rambler-type house were both demolished at 5 psi (see Figure 2), though another unreinforced brick house remained standing after being subjected to 1.7 psi. Reinforced concrete and masonry block structures suffered extensive but minor damages at pressures of 5 psi. For a 10-megaton air blast, the pressures of 5 psi would obtain out to 9 1/2 miles

Figure VI-2³



Unreinforced brick house before a nuclear explosion, Nevada Test Site.

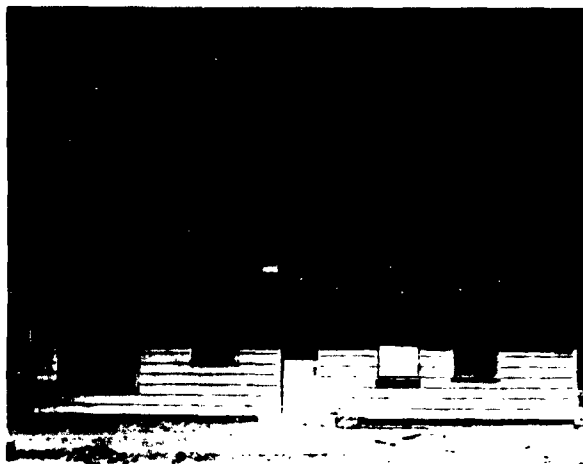
Figure VI-3



Unreinforced brick house after a nuclear explosion (5 psi overpressure).

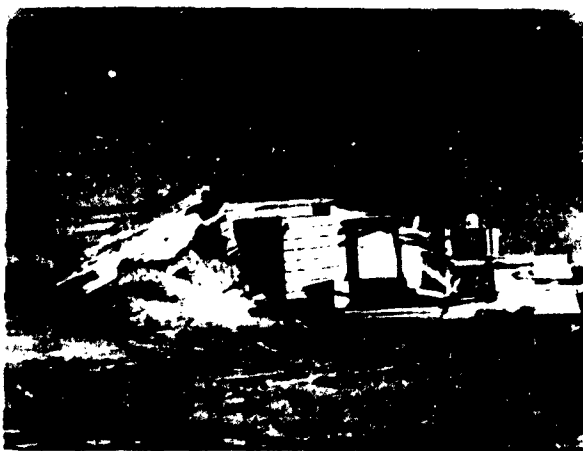
³Figures VI-2 - VI-10 are taken from The Effects of Nuclear Weapons. Department of Defense. Washington, D. C.: U. S. Government Printing Office, 1962.

Figure VI-4



Rambler-type house before a nuclear explosion, Nevada Test Site.
(Note blast door over bathroom window at right.)

Figure VI-5



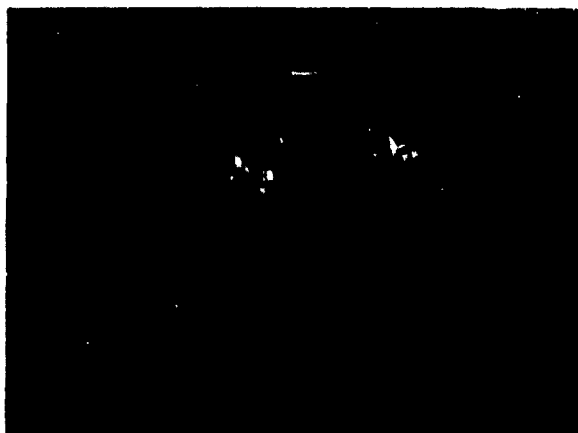
Rambler-type house after a nuclear explosion (5 psi overpressure).

Figure VI-6



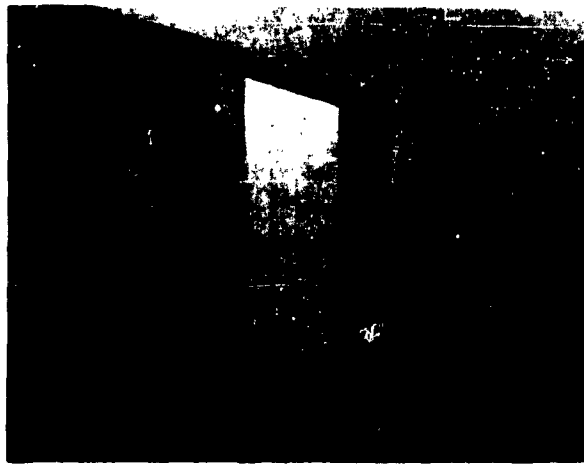
**Rigid steel-frame building before a nuclear explosion,
Nevada Test Site.**

Figure VI-7



**Rigid steel-frame building after a nuclear explosion
(3.1 psi overpressure).**

Figure VI-8



Exterior of self-framing steel panel building before a nuclear explosion, Nevada Test Site.

Figure VI-9



Self-framing panel building after a nuclear explosion
(3.1 psi overpressure).

Figure VI-10



Heavy wall-bearing structure; the 28-inch thick exterior walls of brick with buttresses were shattered (0.34 mile from ground zero at Nagasaki).

from ground zero; of 1.7 psi out to 20 miles, i.e., in an area of over 1200 square miles.

2. Industrial Structures. At the Nevada test site, a rigid steel-frame building and a self-framing steel panel building were both demolished by pressures of 3.1 psi (see Figure 3), though a self-framing corrugated panel building suffered only minor damages at a similar location. Steel-frame buildings were generally stripped and even displaced by pressures of 3.5 to 6.5 psi, the displacement not occurring at these pressures unless the positive pressure phase lasted for over a second (for any bomb over about 20 kt, the 3.5 psi wave has a positive phase of over one second).

3. Commercial and Administrative Structures. These buildings are generally more substantially constructed than industrial or residential structures. The data on such structures comes entirely from the Japanese detonations. Reinforced concrete-frame buildings, although frequently left standing after incredible overpressures, were generally damaged irreparably by the blast wave out to the 10 or 15 psi line (see Figure 4). Glass windows were generally shattered by overpressures of over 1 psi, and occasionally broken for miles further. The only multi-story steel-frame building subjected to the Japanese blasts was not severely damaged but was too far away from ground zero to allow any comparisons.

In the above sections, only blast damage has been considered. It should be noted that subsequent fire damage can be even more devastating. Fires, once started, can spread easily through the rubble, and damaged water lines make this a danger difficult to combat. Much of the damage sustained in Hiroshima was primarily a result of intense fires rather than blast pressures.

Transportation. Damage to automobiles, buses, trolley cars and the like derives primarily from drag forces and fire rather than overpressure. In tests in Nevada, such vehicles were badly battered at 5 psi, but the engines

were generally still operable. High winds, however, can toss vehicles about at considerable distances from the blast, spilling gasoline which adds to the fire danger already extant because of the usually flammable interiors. The AEC estimates that severe damage will be sustained by such vehicles out to about six miles from a 10-megaton airburst. In addition to directly damaging vehicles, the nuclear blast can fill the streets with rubble for many miles, and subsequent fires can distort rails. Bridges seem to sustain blast damage fairly well, but blast waves reflected from beneath can destroy these at surprising distances. The destruction of railroad equipment can have an especially deleterious effect, as the nodes of railway systems usually occur in cities. At the Nevada test site, a 20-ton boxcar was lifted off its trucks by a blast wave of only 6 psi, but a diesel locomotive at the same location remained running after the blast. Transport-type aircraft can be damaged by overpressures as low as one or two pounds per square inch, and damage beyond repair may be expected to result from pressures over 4 psi. Ships are severely damaged or sunk by pressures of 10 to 12 psi, and may be immobilized by pressures as low as 5 psi. As with other artifacts, transportation vehicles may be irradiated sufficiently by fallout to require extensive decontamination before use.

Communications and Utilities. In the Japanese attacks, above-ground electrical and telephone lines were damaged severely out to areas with overpressures under 3 psi, but underground circuits were little affected. In tests in Nevada, many suspension towers and utility poles collapsed or burned, even in areas sustaining overpressures of slightly under 5 psi, though a transformer substation in the same area sustained only minor damage, mostly broken glass.

The public utility system in Nagasaki was somewhat similar to that of smaller towns in the United States. The water-supply system there

was disrupted almost entirely, largely because of the rupture of pipes inside and at the entrance to structures. Underground gas and water mains were relatively unaffected, but this would not be the case with a crater-forming surface burst. Gas containers, on the other hand, were destroyed by 6 psi pressures, and the contents were ignited. Natural and manufactured gas and liquid petroleum installations appear fairly resistant except for copper tubing connections. At overpressures of 5 psi in Nevada, most small storage tanks were unaffected, and domestic gas and electric appliances suffered only moderate damage even in demolished houses.

Similarly, radio and television sets in houses proved quite resistant, being frequently operable although covered with debris and in broken cases. The weak link in the communication system appears to be the power source (or in the case of telephones, the telephone lines). Utility-line poles may fail at considerable distances from a large blast, and communication systems dependent on these sources will suffer accordingly, even though the equipment itself is unharmed.

Foodstuffs, medicines, etc. The blast effects on foodstuffs are fairly obvious. Fresh food products, such as potatoes and apples, may be damaged by bruising and crushing, and foods in light cardboard containers may be seriously contaminated by splintered glass. Some foods and medicines, most notably those containing sodium, can acquire induced radioactivity, but at the distances at which this would occur, the products would likely be destroyed by blast or fire. Most foods and water are not adversely affected by radioactivity, but any fallout material adhering to them must be removed before consumption. Products stored in dust-tight containers, therefore, are safe for consumption, and it is only necessary to wash the container before opening. Contaminated fresh fruits and vegetables can sometimes be decontaminated by washing and peeling, but otherwise, they may be unsafe. Water from underground sources should be safe, and even

water from contaminated resevoirs may be rendered fairly harmless by the usual treatments of coagulation, sedimentation, and filtration. Other procedures, however, such as boiling and chlorination, have no value whatever. Fortunately, most of the radioactive products of a nuclear blast decay rapidly; originally contaminated products become safe after a few days to two or three weeks. As mentioned before, however, some elements such as Strontium-90 and Cesium-137, remain radioactive for many years, and may seriously endanger crops and milk production. For further details, see (11, 13, 25, 31, 42).

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CHAPTER VII. VARIATIONS IN NUCLEAR ATTACKS

In this chapter, we broaden the scope of our view from the effects of a single nuclear explosion to a consideration of the ways a nationwide nuclear attack may vary in its effects on the target country. The obvious point that the effects on a country, as a whole, will be quite different from the effects described for the immediately surrounding area of a particular detonation is often not made in discussions of the effects of a nuclear attack. It is clear that most effects vary with distance from ground zero and any attack would consist of some number of detonations distributed in time and space. This means that in most attacks that it is realistic to consider, the largest part of the land mass of the United States would not be directly affected by the immediate blast and fire effects of the attack.

Different figures are given by authorities making different sets of assumptions, but speaking at a very gross level of analysis, almost any major attack would result in several millions of casualties. Also several millions would be in situations where their total physical environment would be drastically altered by the direct effects of nuclear explosions. Often overlooked in this picture is that several millions of Americans would not be able to tell from any alterations in their immediate physical environment (except for fallout) that an attack on the United States had occurred. The specific areas of the country affected in these different ways, the numbers of people involved, the extent of blast and fire damage in particular locations, and the nature of the radiation hazard would differ depending upon the characteristics of the particular attack. The verbal convention of speaking of the effects of "an attack" may well contribute to the frequent failure to recognize that attacks may vary widely in many dimensions, and a corresponding variation in effects can be expected.

In studying the possible effects of a nuclear attack, it must be clearly understood that a range of possible attack variations must be considered, and in a strict sense, speaking of the effects of "an attack" has no real meaning unless the characteristics of a particular attack are specified. It is not surprising to find, therefore, that different people have described the effects of "an attack" on the United States in quite contradictory terms. Commonly, it will be found that they had different attacks in mind.

The attacks under discussion here consist of a distribution, in time and space, of multiple thermonuclear detonations. The possible combination of nuclear weapons with chemical and biological weapons or with invasion by conventional forces is not considered in this discussion.

Magnitude of an Attack

Conventionally, the magnitude of an attack is referred to by the total yield, in megatons, of the nuclear weapons involved. The attack assumed in the 1957 Holifield Committee hearings, for example, was a 2500 megaton attack.¹ One of the major studies of the probable fallout threat for the United States employed two assumed attacks, 1840 and 4080 megatons respectively.² Attack yields which are realistic to consider as possibilities in the next decade probably fall within the 1000 to 10,000 megaton range. These limits are given solely to indicate the order of magnitude of attack that appears reasonable to consider. They do not represent any official doctrine, but are estimates derived from a number of considerations and sources. Without trying to justify the specific figures selected, suffice it to say that as one moves toward the lower end of the range, it becomes harder to imagine why an enemy would initiate a "small" attack when to do so would provoke a massive retaliation, and as one moves toward the upper end of the range, consideration of cost, availability

¹Hearings before the Congressional Subcommittee on Radiation. Biological and environmental effects of nuclear war. Washington, D. C.: U. S. Government Printing Office, June 22-26, 1959, p.135.

²Callahan, E. D., et al. The probable fallout threat over the continental United States. Washington, D. C. Office of Civil Defense, 1960, pp. 20 and 43. (Report No. TO-B 60-13)

of delivery systems, etc., play increasingly important roles in determining estimates of the size of a probable attack. Greater attacks are conceivable, but they do not appear very likely in the time-frame under discussion.

In terms of the thermonuclear weapons likely to be operationally available within the next decade, the size of the warhead by which an attack would be delivered is apt to vary between .5 and 30 megatons each.³ In general, the delivery system is related to size of the warhead employed. Large missiles of the Atlas and Titan type carry warheads of between four and ten megatons while the smaller Polaris and Minuteman missiles carry about .6 megaton warheads which may be increased in the near future to 1 or 2 megatons.⁴ Although the number of missile systems of the U. S. and the U.S.S.R. are increasing rapidly, the bulk of an attack, if delivered today, would still be carried in long range bombers which can carry warheads of considerably over 20 megatons. Thus, both from targeting considerations and because of the different delivery systems available, an attack of the order suggested would probably consist of between 200 and 1000 individual nuclear warheads.

Targeting Strategy

Probably, a more significant variable for attack effects than total yield is the particular geographical distribution of the individual nuclear explosions--the targeting strategy. Most of the discussion of attack strategies turns around two different target selection criteria and many variants and combinations of

³ Greater yield warheads can, and have been constructed, but the impracticality of the larger weapons stem from the fact that the yield of a nuclear weapon is not linearly related to its destructive potential. An eightfold increase in yield, for example, is required to double the peak overpressure at a given distance from a blast. Much greater damage can be done over a wide area by two 20 megaton weapons bracketing a target area, than from one 40 megaton weapon directly on the target area.

⁴ Hadley, A. T. The nation's safety and arms control. New York: The Viking Press, 1961, pp. 21, 22.

each. On the one pole, is an attack delivered upon our capabilities of retaliation, i.e., our nuclear striking force. This is the so-called counter-force attack. On the other pole, is the counter-value attack delivered upon cities and aimed at destroying that which the nation values. Although the targets in these two strategies are discernibly different--airfields, missile sites, SAC Headquarters, etc., versus cities--the military targets distributed throughout the country, in many instances, are close to large population concentrations. For the society as a whole, the effects from these two different attacks would probably differ in degree, but not in kind. An attack on cities would produce more casualties than a counterforce attack of the same magnitude, would produce a wider range of destruction, and probably would have a greater disruptive impact on the functioning of society. It is difficult to see, however, how a counterforce attack would produce different kinds of societal effects than would be produced by a counter-value attack. This is to say that regardless of which targeting strategy is assumed, the full range of kinds of effects can be expected to occur. Such a statement tends to blur the distinction between the two targeting strategies as far as kinds of societal effects are concerned and this blurring is intentional. However, this statement is in no way intended to minimize the differences in degree of various kinds of effects. Consider for example, the differences between the effects on transportation capabilities which would result from an attack aimed at all major urban areas and from an attack strictly limited to military targets. In both cases, substantial disruption to the transportation system is likely to occur. In the latter instance, however, substantially greater proportion of the country's transportation capabilities would remain intact than in the attack on cities. And the consequences of this difference would reverberate throughout almost all of the activities involved in societal functioning.

Specific Locations of Explosions

The effect on the total society then, would vary with the targeting strategy employed. More particularly, attack effects will vary with the specific location of individual nuclear detonations. Even if targets are specified, the actual effects in the target area may vary widely with the exact location of the detonation. Factors such as aiming error, delivery system failure, and the influence of active countermeasures can greatly influence the distance between the intended and actual point of impact. Some bombers and missiles would be intercepted before reaching their target areas. For those that get through, system errors and countermeasures may deflect the war-head many miles from its intended target. Such differences in actual impact points can create great variation in total effects even if all other attack variables are the same. Thus, even when targets are specified, and yields, burst altitudes and type of bombs are known, the possibility exists for significant differences in attack effects.

Variations in Individual Nuclear Detonations

So far, three variables in attacks have been identified--total yield, targeting strategy, and specific location of impact points--all of which can vary widely for any attack. There is another set of variables which are properties not of the total attack but of each individual nuclear detonation. Since the total effect of an attack is some combination of the effects of individual detonations, the possible variations in individual explosions need to be considered.

As was seen in the preceding chapter, the particular effects of a specific explosion will vary with certain characteristics of the weapon and of the target area. Three weapon variables must be considered (1) yield, (2) burst altitude

and (3) type of bomb. At least four target area variables must be taken into account: (1) weather conditions, (2) terrain, (3) time of day, (4) local counter-measures (warning, evacuation, shelter). For any one nuclear explosion, each of these variables may assume a wide range of values. The effects of an explosion would be related to the particular values of each of these variables and to certain interactions among them. A brief indication of the variation in effects that would be associated with differences in the variables is in order.

Weapon Variables

Weapon Yield. Weapon yield specifies the power of the warhead. All other factors held constant, effects from the shock wave and the thermal pulse are predictably, but not linearly, related to weapon yield. An often used rule-of-thumb is that effects will vary with the cube root of the yield. A 1 megaton airburst would produce an overpressure of 5 psi at about 3.8 miles from ground zero. Applying the cube root rule, to double the overpressure at that distance or to produce the same overpressure at double the distance, an 8 megaton warhead would have to be used. It is clear that the extent of damage over some local area would vary markedly between a strike by a fraction of a megaton warhead lobbed in from a submarine and a 20+ megaton strike from a manned bomber. Primarily, variations in weapon yield will be reflected in the extent of the area over which effects occur.

Burst Altitude. The altitude of a nuclear explosion will influence effects in a number of ways. Most prominent is the absence of radioactive fallout in explosions high enough above the ground that the fireball does not touch earth. Surface bursts maximize the amount of material which is vaporized, radiated, and sucked up to high altitudes to later come to earth as fallout. An attack consisting of nothing but airbursts would be fallout free while an attack entirely by surface bursts would maximize the fallout hazard. Any attack would probably consist of some of both thereby creating more severe fallout problems in some areas than in others.

An airburst spreads its thermal and pressure effects over a wider area than a surface burst. Terrain variation makes less difference with an airburst because there is less chance for high ground to provide a masking effect. In an airburst, the thermal radiation travels in straight lines to points over a much wider radius than in a surface burst. A surface burst, on the other hand, discharges much of its force directly into the earth causing far greater damage to underground structures and facilities and creating far greater destruction in the immediate area of impact. Variation in altitude of the explosions, therefore, is an important factor in calculating the effects of a nuclear attack.

Type of Bomb. This factor has been discussed in the preceding chapter. The primary difference that bomb type can make is in amount of radiated fallout produced. This applies to the atomic, fission, fission-fusion, and fission-fusion-fission types currently available (see Chapter VI). Consideration is not given here to futuristic types of bombs that have been proposed, the neutron bomb, for example.

From just the three weapon variables discussed here, it is evident that the effects of any one explosion can vary widely with differences in these variables.

Target Area Variables

In combination with the weapon variables, at least four variables relating to the target area must be taken into account in order to specify the physical effects of a particular nuclear detonation. All but one of these has been discussed in Chapter VI and they will be mentioned only briefly here.

Weather. Rain, snow, clouds, and fog will attenuate fire effects and will also effect fallout. For the country as a whole, there is little chance that weather conditions will be uniform at all target areas and the variations must be taken into account in predicting actual effects. Weather preceding the attack will also make a difference especially with regard to fire. Dry forested areas may facilitate the spread of fire whereas wet or snow covered areas would resist the spread of fire. Time of year of the attack is also likely to have an influence. In cold weather, more fires would exist in an area in the form of furnace fires and active heating plants of all sorts. The danger of fire is increased in such an area because of the possibility of blast damage upsetting these sources of fire. One of the most prominent influences of weather is the effect of winds on fallout distribution. Identical strike patterns may produce widely discrepant fallout distribution as a function of the prevailing winds at the time.

Terrain. The topography of an area will have greatest influence in the event of a surface burst. In that case, high land masses can act as a shield for areas whose straight line distance to the blast point is interdicted by the land mass. The overpressure and thermal pulse which reach such areas will be attenuated. Such masking effects would be less the higher the altitude at which the burst occurs.

Time of Day. The time of day at which the explosion occurs would have some influence on casualties to be expected. The diurnal fluctation in the location of people within any area would be reflected in amount of shelter available and in the numbers of people at different distances from ground zero. Consider the differences between the effects of a nuclear explosion (assume without any warning for purposes of the example) occurring over central Washington, D. C. at 11:00 A. M., 5:30 P. M., and 2:30 A. M. There are obvious marked differences in the location of the population at these different times.

Local Countermeasures. Another major factor relating to the effects of a particular explosion on an area is the nature and extent of the local countermeasures available and the degree to which they were employed. Evacuation, warning, and shelter are the primary countermeasures to consider. How much warning, the extent to which warning was appropriately responded to, how much shelter was available, and how many people got in to shelters, and how many, if any, were evacuated from the area would all combine to make a large difference in the casualties resulting from the explosion.

* * * *

The brief discussion of these seven factors has been non-technical and non-quantitative, but should serve to make the point that the effects on a particular area can vary enormously with differences in the factors discussed. Similarly, the effects of an attack for the country as a whole can be widely different even for attacks equal in total yield. It is, of course, possible to specify the values of all of these variables for a hypothetical attack and calculate the effects in relatively precise and quantitative terms. A number of damage assessment techniques are available for this purpose most of which utilize high speed computers.

It should be clear that to specify the immediate effects of an attack, a large number of factors must be taken into account. This can be, and is, done regularly by such facilities as the National Resources Evaluation Center. However, it is misleading to specify the immediate effects of a precisely defined attack and use the results as if they were representative of all possible attacks. While we may become increasingly sophisticated about attack strategies, we are not likely to be in position to predict with great accuracy, the specific characteristics of an attack, should one ever come. For this reason, civil defense must be prepared to deal with a wide range of possibilities.

Some Derivatives of Immediate Attack Effects for the Nation as a Whole

So far we have confined our attention to variations in immediate direct effects of a number of nuclear explosions. Such effects are describable in terms of degree of destruction to facilities, resources, and commodities of all sorts; the death and injury of people; and in the alterations of the physical environment. These kinds of damage are important in and of themselves, but probably much more so in terms of the implications they have for the continued functioning of the total social system.

The loss of life and physical resources and the alteration in the physical environment would be immediately reflected in the functioning of a number of processes necessary and vital to the ways of living which have evolved in our modern, technologically based, industrial society. For the survival and recovery of the society, the important effects of an attack are those which are reflected in an impairment of the performance of activities vital to the functioning of the social system.

The particular effects an attack would have on these activities would depend, of course, on the variations in attack discussed in the preceding sections. It is appropriate, however, to mention some of the activities or functions and suggest some of the likely derivative effects that may occur.

Communication. The multiple, complex, and widely proliferating systems for the exchange of information necessary to the accomplishment of the varied activities of a modern technological society would be damaged in many different ways. In the area of blast effects, damage to or destruction of facilities such as telephone exchanges, power sources, radio transmitters, printing presses and the like would be expected. For many undamaged facilities, operators and technicians may face severe radiation hazard for considerable

periods of time. Much damage, easily repairable under normal conditions, would present near-insurmountable difficulties because of the radiation hazard and shortages in repairmen, supplies, and equipment.

The normal functioning of the social system is dependent on the ability of its different elements to communicate. Any concerted effort by different parts of the system towards any common goal would require the ability to communicate among the different parts. To the extent that communication capabilities are degraded, survival and recovery become more difficult. Almost any attack one can conceive would profoundly disrupt communication capabilities in some areas and have little effect on them in others. It is clear also that communications play vital roles in other processes such as control and production.

Control. The control mechanisms in any functioning system can be viewed as the means by which decisions made by one part of the system are implemented by other parts. Inherent in this concept of control are at least three elements: (1) decision making, (2) communication of decision, (3) and acceptance and implementation of the decision. Control mechanisms are integral parts of Federal, state, and local government, commercial, business and industrial organizations as well as any organization which acts as an organization. Clearly, damage to communications capabilities will impair the functioning of control mechanisms. Large segments of an organization may be destroyed; particular key role incumbents may be casualties or unable to perform in their organization role. Impairment of control functions is likely to be severe in target areas. Because most of the important control mechanisms are geographically dispersed, it is difficult to assess without extensive detailed analysis just what control capabilities are likely to exist for the country as a whole after any hypothetical attack, but it is reasonable to suppose that pre-attack control capabilities are likely to suffer severe impairment.

Maintenance. Maintenance activities are those directed toward the satisfaction of elementary needs of living. Much of society is organized to provide these necessities of life for the entire population. Such activities involve the provision and utilization of water, food, housing, utilities, medical service and consumer goods. It is clear from the foregoing that severe disruption would occur in the orderly provision of these necessities and important long run effects of an attack will be reflected in the degradation of maintenance activities.

Transportation. Modern technology requires the rapid and efficient movement of human and non-human resources. The damage done to transportation facilities and personnel will have reverberating effects throughout the social system as the distribution and production functions become adversely affected because of inadequate transportation.

Production. A nationwide nuclear attack would sharply reduce productivity immediately and perhaps completely stop producing activities for some period of time. A population can consume that which is in inventory without producing, but by the time inventory is exhausted the production pipeline must be filled again. One of the major requirements for recovery is the resumption of production. How the producing activities are affected throughout the country can vary substantially with the characteristics of the particular attack assumed.

Conclusions

The purpose of this chapter has been to provide an overview of the ways in which nuclear attacks can vary and to suggest some of the possible variations in immediate and derivative attack effects. Attention has focussed strictly on physical variables and effects. Ultimately, our interest is in studying social

and psychological consequences of the immediate effects, but to do so implies the ability to specify the independent situational variables some of which are the direct, physical attack effects. One of the objectives of this chapter, therefore, is to familiarize the behavioral scientist with the host of variables with which he must contend.

It is hoped that two conclusions are evident from the preceding material. First, that the possibility for variation in attack effects is enormous. Second, the behavioral scientist studying possible social and psychological effects of nuclear attacks needs to find a way to take such variations into account in his investigations and develop the means for relating his findings to attack variations. Basically, this is the problem to which the concept of Standard Situational Cases in Chapter V is addressed.

APPENDIX A

**AN OVERVIEW OF THE ORGANIZATIONAL HISTORY OF
FEDERAL CIVIL DEFENSE IN THE UNITED STATES**

APPENDIX A

An Overview of the Organizational History of Federal Civil Defense in the United States

This brief overview is presented for the benefit of those who may not be familiar with Federal civil defense activities and organization over the past decade. The several hearings and reports of the House Committee on Government Operations (referenced in footnotes) are useful sources of more detailed information.

The first evidence of a major organized effort in the field of civil defense was marked by the enactment of the Federal Civil Defense Act of 1950, which provided for a Federal Civil Defense Administration (FCDA). This administration was established as an independent agency and vested with the responsibility for development, coordination, guidance, and leadership of a national program of civil defense, designed to protect life and property in the United States in the event of attack. Under this Act, individual states and their subdivisions were charged with the responsibility for carrying out physical preparations for civil defense, while the job of the Federal Government was to provide assistance and encouragement where needed. Financial assistance to states for the purchase of equipment was prohibited, and amounts authorized to be appropriated annually for payment of travel expenses and per diem for instructional purposes were limited to \$100,000.

The next major step in civil defense planning was the establishment, by executive order, of the Defense Mobilization Board in 1951,¹ which was

¹ Executive Order 10200, January 3, 1951.

precipitated by the Korean conflict. The DMB was instituted to coordinate the varied policies and activities of principal departments and agencies within the government that were participating in the defense program.

In 1953, the Office of Defense Mobilization was established in the Executive Office of the President as a policy planning and coordinating agency to enable one body to exercise strong leadership in the national mobilization effort--which included both current defense activities and readiness for any future national emergency.² In 1955, the Military Operations Subcommittee chaired by Congressman Chet Holifield, began a comprehensive examination of the program and operations of the FCDA. Upon completion of this examination in 1956, the subcommittee concluded that the FCDA has "not fully grasped the technical, administrative or economic requirements of an effective civil defense program."³ At that time, the subcommittee recommended the creation of a cabinet-level Federal agency, vested with broad statutory authority, and charged with the responsibility of planning and administering a national civil defense program. A key element of the plan recommended in the 1956 subcommittee report was a nation-wide shelter-construction program to provide protection for the American people against the devastating effects of nuclear weapons. The subcommittee also recommended at that time the consolidation of FCDA functions and those of the Office of Defense Mobilization.

It was the idea of the subcommittee that the FCDA program (legislation embodied in Public Law 920), derived primarily from World War II experience was consequently outdated. Subsequently, bills were

² Reorganization Plan No. 3 of 1953 (67 Stat. 634), Executive Office of the President.

³ "Civil Defense for National Survival," 24th intermediate report of the Committee on Government Operations (H. Rept. No 2946) 84th Congress, 12th Session, July 27, 1956, p. 2.

introduced in the 85th Congress (1957) to carry out the recommendations of the subcommittee report, but these were not endorsed and congressional action was not taken.

The organizational structure of Federal civil defense was partially modified as a result of the subcommittee's basic study in 1956. In 1958, however, Reorganization Plan No. 1 replaced the FCDA and the ODM with the Office of Civil and Defense Mobilization (OCDM), which was created as a new agency within the Executive Office of the President. This action, however, did not alter the basic legislative foundation of Federal civil defense or change the substantive content of the program which was previously administered by the FCDA and the ODM. The chief benefit of the plan was the consolidation of all defense mobilization and civil defense planning functions in a single agency.⁴ In addition, the financial responsibility for developing a civil defense program became vested jointly in the Federal Government and the several states and their political subdivisions. Accordingly, provisions were made for increasing available funds and personnel to implement the plan.⁵

The National Plan

Reorganization Plan No. 1 also provided for a "National Plan for Civil Defense and Defense Mobilization." This plan was constructed as a doctrinal textbook for the OCDM and local civil defense officials.

⁴ Civil Defense Shelter Policy and Post-Attack Recovery Planning. 21st report by the Committee on Government Operations. (H. Rept. No. 2069) 86th Congress, 2nd Session, July 1, 1960, p. 3.

⁵ Text of Federal Civil Defense Act of 1950, as amended January 26, 1959, No. 226, Office of Civil and Defense Mobilization.

It is described as an amalgamation of all the fundamental responsibilities, policies, and procedures for conducting the entire civil defense program, and contains a number of annexes that provide detailed operating plans and action measures for the various aspects of civil defense. The plan anticipates three principal contingencies:

- 1) International tension, but not of such extreme nature as to require the invocation of full emergency authorities.
- 2) Limited war, defined as a situation in which United States forces are engaged overseas, but in which there is no immediate expectation of nuclear attack on the continental United States.
- 3) General war, including massive nuclear attack.

The plan was designed to be adaptable and flexible to changes in international relations, techniques and materials of warfare and to other pertinent factors.⁶ Revisions and additions are made to the plan from time to time as the need arises.

In recent years, the National Plan has been criticized for its shortcomings. In the Military Operations Subcommittee Report of July 1, 1960, the committee describes the National Plan as a "paper plan" which defines and assigns responsibilities in general terms, but does not evaluate the ability of the assignees to perform these tasks. It tells, in other words, "who" is to do "what" in civil defense, but not "how" or "how well" the job should be done. The contents of the National Plan are given in Table A-1.

More Recent Developments

One of the more recent events in the history of civil defense is the reorganization of the entire civil defense program. President Kennedy, in Executive Order No. 10952, July 20, 1961, ordered the transfer of major

⁶ The National Plan for Civil Defense and Defense Mobilization, Executive Office of the President, OCDM, October, 1958.

Table A-1

**THE NATIONAL PLAN FOR CIVIL DEFENSE
AND DEFENSE MOBILIZATION**

Annex

- 1. Planning Basis**
- 2. Individual Action**
- 3. Organization for Civil Defense and Defense Mobilization**
- 4. Authorities for Civil Defense and Defense Mobilization**
- 5. Federal Delegations and Assignments**
- 6. Federal Emergency Plans and Procedures**
- 7. Role of the Military**
- 8. Preparations for Continuity of the Government**
- 9. Public Information**
- 10. National Shelter Plan**
- 11. Protection of Essential Facilities**
- 12. Directed Movement**
- 13. Warning**
- 14. Damage Assessment**
- 15. Communications**
- 16. Maintenance of Law and Order**
- 17. Disaster Services**
- 18. National Health Plan**
- 19. Emergency Welfare**
- 20. (Incorporated in #19)**
- 21. National Fire Defense Plan**
- 22. Explosive Ordnance Reconnaissance**
- 23. National Radiological Defense Plan**

Table A-1 (continued)

24. National Biological and Chemical Warfare Defense Plan
25. Maintenance of Essential Resources
26. (Incorporated into Annex #11)
27. Emergency Economic Stabilization
28. Management of Emergency Production
29. (Incorporated into Annex #27)
30. National Manpower Plan
31. National Food Plan
32. National Water Plan
33. National Energy and Minerals Plan
34. National Transportation Plan
35. Emergency Administration of Essential Facilities
36. Research and Development
37. Training and Education
38. Federal Assistance
39. Review, Tests and Inspection
40. Natural Disasters
41. (Discontinued)
42. National Emergency Housing Plan

civil defense responsibilities to the Office of Civil Defense within the Department of Defense. In this order, he also authorized the reconstitution of the Office of Civil and Defense Mobilization as a small Presidential staff agency under the title of Office of Emergency Planning (OEP). In an address to Congress on "Urgent National Needs" on May 25, 1961, President Kennedy reminded the Legislative Branch that the United States has never really adopted a consistent civil defense policy. He went on to say that public consideration toward civil defense have been for the most part, characterized by apathy, indifference and skepticism, while at the same time many of the proposed civil defense plans have been so far-reaching or unrealistic that they have not gained essential support. In this same address, the President stated his intent to reorganize the entire program into the structure that we currently find.

The newly established Office of Civil Defense (OCD), under the direction of Mr. Steuart L. Pittman, appointed as Assistant Secretary of Defense (OCD), began with a nucleus staff of about 42 persons recruited from other governmental agencies, the former OCDM, and some outside sources, to develop a new civil defense program and to implement the new organization.

The purpose of the OCD is to coordinate civil defense functions as described in the Executive Order 10952, within the DOD and among the other government agencies. The main resources of the program are being applied to the problem of survival at the community level during an attack and for the weeks following an attack. Its objective is to "locate and stimulate the creation of enough fallout shelter space substantially to meet the full national requirement; and, simultaneously to bring about organization, planning, and training in every community in the country, in order that people will know how to go to shelter space, how to live in it, how to emerge, decontaminate,

and survive in the hazardous first few weeks after attack."⁷ As such, the President has narrowed down considerably the aims of civil defense in the Office of Civil Defense and has implemented a more manageable program. The role of the local civil defense director under this new program should be that of an agent to the Federal Government and a community leader for the shelter program.

The role of the Office of Emergency Planning (OEP), has been designed as that of advising, assisting, and when directed acting for the President in determining policy for planning, directing, and coordinating the total national preparedness program. This includes the performance of functions under the nine Executive Orders that have been issued recently to the various departments of cabinet rank.⁸ One of the major tasks of the OEP will be responsibility for advancing, establishing, and planning arrangements for necessary emergency agencies to come into being when an emergency occurs. It will also devote more time and effort to the nation's basic resources picture, and the broad, long-range national resources picture. The OEP's tasks, therefore, are research, public information, coordination, leadership and evaluation and reporting on major gaps and major breakthroughs in the over-all civil defense program.

⁷ Civil Defense--1962. Hearings before a Subcommittee of the Committee on Government Operations, House of Representatives. 87th Congress. Part I, Text of Witnesses, February, 1962, p. 7.

⁸ Civil Defense--1961. Hearings before a Subcommittee of the Committee on Government Operations, House of Representatives, 87th Congress, August, 1961, p. 51.

Civil Defense Budget

The following tables give a rather complete picture of the history of budget appropriations, expenditures, etc., broken down into major categories for the civil defense programs from 1951-1961.

In the next fiscal year, the Federal Shelter Incentive Program plans to support the construction of 20 million shelter spaces. This program would be retroactive to January, 1962, to provide payment for qualifying projects begun then. The qualifications necessary are that each shelter accommodate a minimum of 50 people and when completed be marked, stocked with food, water, first aid equipment, and have a radiation meter. These spaces would also be available for use in time of emergency under the direction of civil defense employees.

OCDM APPROPRIATION HISTORY (1951 THROUGH 1961)

Fiscal year	Requested of Budget Bureau	Requested of Congress	Appropriated by Congress	Actual expenditures
1951	\$730,215,200	\$403,000,000	\$31,750,000	\$143,756
1952	588,380,000	537,000,000	77,021,250	34,365,655
1953	1,032,600,950	601,550,000	44,250,000	52,130,083
1954	289,475,600	153,250,000	49,275,000	61,514,495
1955	138,845,000	89,511,000	50,186,000	43,833,512
1956	93,037,500	78,170,000	70,900,000	58,023,522
1957	134,800,000	125,463,000	95,790,000	65,478,297
1958	144,785,800	132,390,000	41,561,300	66,054,413
1959	112,906,500	76,473,000	45,285,000	45,783,369
1960	259,539,000	101,670,000	\$2,883,000	45,754,903
1961	93,843,000	77,313,000	61,068,000	58,628,316
Total	3,618,058,640	2,374,800,000	619,961,550	\$31,720,920

¹ Includes ODM, ECDA, and OCDM.

² See the following:

Amount not spent which lapsed to U.S. Treasury	\$43,816,000
Unobligated balances carried over into 1962	5,968,747
Unliquidated obligations:	
Federal contributions	20,583,962
All other accounts	17,371,822
Actual expenditures	\$31,720,920
Total	619,961,550

RECAPITULATION OF OCDM TOTAL FUNDING BY MAJOR CATEGORIES (1951 THROUGH 1961)

Category	Requested of Budget Bureau	Requested of Congress	Appropriated by Congress	Expended
Salaries and expenses	\$325,243,390	\$240,455,000	\$170,519,550	\$167,582,000
Federal contributions	750,564,050	266,060,700	142,850,000	99,463,788
Emergency supplies and equipment	1,267,803,310	920,136,300	248,575,000	238,053,338
Research and development	90,684,000	61,220,000	32,000,000	25,897,326
Federal agency assignments	50,790,200	40,582,000	18,817,000	10,673,230
Protective facilities	1,423,083,500	1,700,700,000	2,400,000	115,049
Civil defense procurement fund	95,000,000	70,000,000	5,000,000	25,500
Total	3,618,058,640	2,374,800,000	619,961,550	\$31,720,920

¹ Excludes \$2,219,000 authorized from funds appropriated to the President.

² Includes funds requested for the construction of protective facilities on a matching basis in the amounts of \$250,000,000 in 1951, 1952, and 1953 and \$8,000,000 in 1954.

OCDM EXPENDITURES BY MAJOR CATEGORIES AND YEARS (1951 THROUGH 1961)

Fiscal year	Salaries and expenses	Federal contributions	Emergency supplies and equipment	Research and development	Federal agency assignments	Protective facilities	Civil defense procurement fund	Total
1951	\$143,756							\$143,756
1952	10,104,704	8513,840	\$20,665,799				\$3,061,312	34,365,655
1953	11,096,199	12,891,727	28,033,231				139,626	52,130,083
1954	10,496,428	12,696,786	40,066,863				-2,739,552	61,514,495
1955	11,294,537	10,470,971	21,061,002				417,092	43,833,512
1956	13,878,076	9,561,976	22,265,163	\$1,134,071	\$1,254,472		-95,896	58,023,522
1957	17,110,253	8,647,943	22,681,045	6,031,657	2,849,950		-734,500	65,478,297
1958	16,615,855	8,324,433	22,374,913	7,990,210	533,471		215,500	66,054,413
1959	22,311,239	8,964,721	9,641,315	5,002,644	24,037		-160,587	45,783,369
1960	26,346,247	4,922,777	9,144,727	3,290,711	-24	\$14,529	-73,064	45,754,903
1961	20,224,736	11,478,624	11,623,290	3,252,032	6,011,405	109,520	-64,291	58,628,316
Total	167,582,000	89,463,788	238,063,338	25,897,325	10,673,230	115,049	25,500	\$31,720,920

OCDM SALARIES AND EXPENSES BY YEARS (1951 THROUGH 1961)

Fiscal year	Requested of Budget Bureau	Requested of Congress	Appropriated by Congress	Expended
1951	\$16,703,150	\$8,390,000	\$1,750,000	\$143,756
1952	35,367,140	21,745,000	13,271,250	10,104,704
1953	43,490,000	33,550,000	9,280,000	11,096,199
1954	27,922,600	15,250,000	11,275,000	10,496,428
1955	17,345,000	13,781,000	12,155,000	11,294,537
1956	17,842,000	15,420,000	14,350,000	13,878,076
1957	26,728,000	22,963,000	17,790,000	17,110,253
1958	32,149,000	27,380,000	19,265,300	16,615,855
1959	41,111,500	26,620,000	\$2,785,000	22,311,239
1960	25,943,000	26,800,000	26,283,000	26,346,247
1961	20,646,000	26,396,000	26,346,000	20,224,736
Total	325,243,390	240,455,000	170,519,550	167,582,000

—OCDM FUNDING FOR FUNCTIONS ASSIGNED TO OTHER FEDERAL AGENCIES BY YEARS (1951 THROUGH 1961)

Fiscal year	Requested of Budget Bureau	Requested of Congress	Appropriated by Congress	Expended
1951				
1952				
1953				
1954				
1955				
1956	\$4,085,580	\$3,050,000	\$1,500,000	\$1,254,473
1957	6,656,000	6,000,000	4,000,000	2,849,899
1958	8,711,800	6,200,000		533,471
1959		2,915,000	500,000	34,057
1960	31,000,000	21,000,000	6,350,000	-34
1961	10,517,000	10,517,000	6,567,000	6,011,406
Total	50,780,380	49,582,000	18,817,000	10,673,230

—OCDM FUNDING FOR CONSTRUCTION OF PROTECTIVE FACILITIES BY YEARS (1951 THROUGH 1961)

Fiscal year	Requested of Budget Bureau	Requested of Congress	Appropriated by Congress	Expended
1951	\$800,000,000	\$250,000,000		
1952	250,000,000	250,000,000		
1953	615,000,000	250,000,000		
1954	51,033,500	8,000,000		
1955				
1956				
1957				
1958				
1959				
1960	8,000,000	2,700,000	1,624,000	\$14,000
1961				100,000
Total	1,422,033,500	760,700,000	2,400,000	114,000

1 For regional underground control centers.

Tables taken from Civil Defense--1961. Hearings before a Subcommittee on Government Operations. House of Representatives, 87th Congress. August 1961, p. 398-399.

APPENDIX B
GLOSSARY OF TERMS RELATING TO NUCLEAR
WAR AND THE EFFECTS OF NUCLEAR
WEAPONS

ABSORPTION COEFFICIENT: A number characterizing the ability of a given material to absorb radiation of a specified energy. It can be computed for a total radiation that enters the absorbing material.

ACTIVITY: The activity of a radioactive material is a measure of the number of atoms that disintegrate per unit time. It is measured in curies.

ACUTE CONJUNCTIVA: See keratoconjunctivitis.

AFTERWINDS: Wind currents set up in the vicinity of a nuclear explosion directed toward the burst center, resulting from the updraft accompanying the rise of the fireball.

AIR BURST: The explosion of a nuclear weapon at such a height that the expanding ball of fire does not touch the earth's surface when the luminosity is at maximum. A typical air burst is one for which the height of burst is such as may be expected to cause maximum blast destruction in an average city.

ALPHA PARTICLE: A particle emitted spontaneously from the nuclei of some radioactive elements. It is identical with a helium nucleus, having a mass of four units and an electric charge of two positive units. The energy is measured in millions of electron volts.

ARTIFICIAL RADIOACTIVITY: Radioactivity produced by adding or subtracting neutrons or protons from the nucleus or in some way altering the constitution of a nucleus. Most of the artificially radioactive elements have short physical half-lives.

ATOM: The smallest or ultimate particle of an element that still retains the characteristics of that element. Consists of a positively charged central nucleus, carrying nearly all the mass of the atom, surrounded by a number of negatively charged electrons, so that the whole system is electrically neutral. The atom of a given element is identified by its atomic number, i.e., the number of electrons about the nucleus.

ATOMIC BOMB: The nuclear weapon that derives its energy from the fission reaction. The sizes range from the equivalent of a few thousand tons of TNT to several hundred thousand.

ATOMIC CLOUD: An all-inclusive term of the mixture of hot gases, smoke, dust, and other particulate matter from the bomb and environment, which is carried aloft in conjunction with the rising ball of fire, produced by the detonation of a nuclear or atomic weapon.

ATOMIC NUMBER: The number of electrons in the atom and of protons in the nucleus. The elements are characterized by their atomic number and are ordered by it in the Periodic Table.

ATOMIC WEIGHT: The relative weight of the atom of an element, referred to a standard element (the atomic weight of hydrogen, the lightest element, is 1.008).

BACKGROUND RADIATION: Nuclear or ionizing radiation arising from within the body and surroundings to which individuals are always exposed. The main sources are potassium-40 in the body, potassium-40 and thorium, uranium, and their decay products including radium present in rocks, and cosmic rays.

BALL OF FIRE: The luminous sphere of hot gases which forms a few millionths of a second after a nuclear or atomic explosion and immediately starts to expand and cool. The exterior of the ball of fire is initially sharply defined by the luminous shock front in air, and later by the limits of the hot gases themselves.

BASE SURGE: A cloud rolling outward from the bottom of the column produced by a sub-surface explosion. For underwater bursts the surge is a cloud of liquid droplets with the property of flowing almost as if it were a homogeneous fluid. For sub-surface land bursts, it is made up of small solid particles but still behaves like a fluid. A soft earth medium favors base surge formation in an underground burst.

BEARING WALL: A wall supporting part of the mass of a structure such as the floor and roof systems.

BETA PARTICLE: A high-speed electron emitted by nuclei which are neutron-rich. As electrons are very light, even with only a few hundred kilovolts of energy they move at speeds near that of light, 3×10^{10} cm/sec. They ionize slightly in comparison to protons or alpha particles of the same energy. Physically, beta particles are identical with electrons moving at high velocity. Most of the fission fragments emit negative beta particles.

BIOLOGICAL HALF-LIFE: Time required for the amount of a specified element which has entered the body to decrease to half of its initial value as a result of natural, biological elimination processes.

BLAST LOADING: The loading or force on an object caused by the air blast from an explosion striking and flowing around the object. It is a combination of overpressure or diffraction and dynamic pressure loading.

BLAST SCALING LAWS: Formulas which permit the calculations of the properties, e.g., overpressure, dynamic pressure, time of arrival, duration, etc., of a blast wave at any distance from an explosion of specified energy from the known variation with distance of these properties for a reference explosion of known energy, e.g., of 1 kiloton.

BLAST WAVE: A pressure pulse of air, accompanied by winds, propagated continuously from an explosion.

BOMB DEBRIS: The residue of a nuclear or atomic bomb after it has exploded. Consists of the materials used for the casing and other components of the bomb, together with unexpended fissionable materials (isotopes of uranium and plutonium) and fission products.

BONE MARROW: The soft tissue that constitutes the central filling of many bones and is responsible for the production of blood corpuscles.

BREAKAWAY: The onset of a condition in which the shock front in the air moves away from the exterior of the expanding ball of fire produced by the explosion of a nuclear weapon.

BRITISH THERMAL UNIT (BTU): The amount of energy required to raise the temperature of one pound of water 1° Fahrenheit.

BURST: An explosion or detonation.

CALCIUM: A silver-white metal, somewhat malleable and ductile; stable in dry air, but in moist air or water reacts to form calcium hydroxide and hydrogen gas; when heated, burns in air to form calcium oxide emitting a brilliant light. An important constituent of bone and of most living systems.

CARBON-14: A radioactive isotope of carbon formed in the atmosphere by neutron bombardment of nitrogen. It emits a beta particle of maximum energy of 0.16 Mev and has a half-life of 5,600 years.

CARCINOMA: Malignant tumors derived from the outer skin, the lining of the body cavities, and certain glands; any malignant tumor arising from epithelial tissue. Includes all disease associated with the presence of such a tumor.

CESIUM-137: A radioactive isotope of cesium, the element of atomic number 55. Emits a 0.66 Mev gamma ray and a beta particle, thus decaying to barium-137, which also emits a 0.66 Mev gamma. It has a half-life of 30 years.

CHEMICAL DOSIMETER: A self-indicating device for determining total radiation exposure dose based on color changes accompanying chemical reactions induced by radiation.

CHROMOSOME: An important constituent of all cells, a thread-like structure containing genes, the basic heredity-determining units. The number of chromosomes per cell varies greatly from organism to organism; a man has 46 chromosomes.

CLOUD COLUMN: The visible column of smoke extending upward from the point of burst of a nuclear weapon. Coming from an air burst, it may extend to the tropopause, i.e., the boundary between the troposphere and stratosphere.

COLUMN OR PLUME: A hollow cylinder of water and spray thrown up from an underwater burst of a nuclear weapon, through which the hot, high-pressure gases formed in an explosion are vented to the atmosphere.

CONDENSATION CLOUD: A mist or fog of minute water droplets temporarily surrounding the ball of fire, after a nuclear detonation in a comparatively humid atmosphere. The expansion of the air in the negative phase of the blast wave from the explosion results in a lowering of temperature so that condensation of water vapor present in the air occurs, and a cloud forms. It is soon dispelled when the pressure returns to normal, and the air warms up again.

CONELRAD: An abbreviation for Control of Electromagnetic Radiation, an emergency communications system in which all commercial broadcast stations will leave the air except those assigned to instruct the public at 640 and 1,240 kilocycles. Intended to nullify enemy equipment that uses radio signals to pinpoint targets.

CONJUNCTIVA: The thin membrane covering the eyeball: is continued as a lining of eyelids.

CONJUNCTIVITIS: An inflammation of conjunctivae, caused by wind, dust, or other foreign bodies, or an infection.

CONTACT SURFACE BURST: See surface burst.

CONTAMINATION: The deposit of radioactive material on the surfaces of structures, areas, objects, or personnel after a nuclear explosion. It generally consists of fallout in which fission products and other bomb debris have become incorporated with particles of dirt, etc. Contamination can also arise from the radioactivity induced in certain substances by the action of bomb neutrons.

COSMIC RAYS: High energy particles bombarding the earth from outer space. Particles hitting the top of atmosphere are mostly protons, but in the collision with air nuclei, other forms of radiation are produced with a wide range of energies and penetrating power.

CRITICAL MASS: The minimum mass of a fissionable material that will just maintain a fission chain reaction under precisely specified conditions, e.g., nature of material and its purity, nature and thickness of tamper or neutron reflector, density or compression, and physical shape or geometry. For an explosion to occur, the system must be supercritical, i.e., the mass of material must exceed the critical mass under the existing conditions.

CUBE ROOT LAW: A scaling law applicable to many blast phenomena. Relates to time and distance at which a given blast effect is observed to the cube root of the energy yield of the explosion.

CURIE: A unit of radioactivity; the quantity of any radioactive species in which 3.700×10^{10} nuclear disintegrations occur per second. One gram of radium has an activity of one curie.

CYCLOTRON: An apparatus for imparting high speeds to electrified particles by electromagnetic and electrostatic means, used especially for bombarding the nuclei of atoms to produce transmutations and artificial radioactivity.

DAMAGE CRITERIA: A standard or measure used in estimating specific levels of damage.

DAUGHTER PRODUCT: The nucleus left when a radioactive nucleus emits a particle. In many cases the daughter product is also radioactive.

DECAY: Decrease in activity of any radioactive material with the passage of time because of spontaneous emission from the atomic nuclei of either alpha or beta particles, sometimes accompanied by gamma radiation. Synonymous with disintegration.

DECONTAMINATION: The reduction or removal of contaminating radioactive material from a structure, area, object, or person. May be accomplished by treating the surface so as to remove or decrease the contamination: by letting the material stand so that radioactivity is decreased as a result of natural decay, or by covering the contamination so as to attenuate the radiation emitted.

DEUTERIUM: An isotope of hydrogen of mass 2 units; sometimes referred to as heavy hydrogen. Can be used in thermonuclear fusion reactions for the release of energy.

DIFFRACTION: Bending of waves around the edges of objects. In connection with a blast wave impinging on a structure, it refers to the passage around and envelopment of the structure by the blast wave.

DISINTEGRATION: See decay.

DOME: The mound of water spray thrown up into the air when the shock wave from an underwater detonation of a nuclear weapon reaches the surface.

DOSE: A total or accumulated quantity of ionizing radiation. Often used in a sense of the exposure dose, expressed in roentgens.

DOSE RATE: The amount of ionizing radiation to which an individual is exposed per unit of time. Usually expressed as roentgens per hour or in multiples or submultiples of these units, e.g., milliroentgens per hour. Commonly used to indicate the level of radioactivity in a contaminated area.

DOSIMETER: An instrument for measuring and registering total accumulated exposure to ionizing radiation. Also indicates the amount of radiation a person has absorbed.

DOSIMETRY: The theory and application of the principles and techniques involved in the measurement and recording of radiation doses. Its practical application is concerned with the use of various types of radiation instruments with which measurements are made.

DRAG LOADING: The force on an object or structure because of transient winds accompanying the passage of a blast wave.

DYNAMIC PRESSURE: The air pressure resulting from the mass air flow behind the shock front or a blast wave; equal to the product of half the density of the air through which the blast wave passes, and the square of the particle velocity in the wave as it impinges on an object or structure.

EFFECTIVE HALF-LIFE: The time for a given isotope in which the quantity in the body will decrease to half as a result of both radioactive decay and biological elimination.

ELASTIC RANGE: The stress range in which a material recovers its original form after the force is removed.

ELECTRON: A particle of very small mass, carrying a unit of negative or positive charge. Negative electrons, surrounding the nucleus, are present in all atoms; their number is equal to the number of positive charges or protons in the particular nucleus. The term electron commonly refers to the negative electrons. A positive electron is usually called a positron, and a negative is sometimes called a negatron.

ELECTRON VOLT: Energy gained by an electron being accelerated through a potential difference of one volt. One electron volt is the equivalent of 4.5×10^{-26} kilowatt per hour or 1.6×10^{-22} BTU.

ELEMENT: A distinct, basic variety of matter occurring in nature which composes substances of all kinds. About 90 different elements are known to exist in nature, and several others, including plutonium, have been obtained as a result of nuclear reactions with these elements.

ENIWETOK PROVING GROUNDS: An area in the Marshall Islands, including the Eniwetok and Bikini Atolls, used for nuclear tests. Formerly referred to as the Pacific Proving Grounds.

EPILATION: Loss of hair, caused by exposure to radiation.

ERG: A unit of energy, equivalent to 6.3×10^{11} electron volts.

FALLOUT: Process or phenomenon of the fall back to the earth's surface of particles contaminated with radioactive material from the atomic cloud. Can be used in a collective sense for the contaminated particulate matter itself.

FILM BADGE: A small metal or plastic frame worn by personnel, and containing X-ray film for estimating the total amount of ionizing radiation to which an individual has been exposed.

FIREBALL: See ball of fire.

FIRE STORM: A stationary mass fire, generally in built-up urban areas, generating strong, in-rushing winds from all sides, which keep the fires from spreading while adding fresh oxygen to increase their intensity.

FISSION: A process whereby the nucleus of a particularly heavy element splits into two nuclei of lighter elements, with the release of substantial amounts of energy. The most important fissionable materials are uranium-235 and plutonium-239.

FISSION PRODUCTS: A general term for the complex mixture of substances produced as a result of nuclear fission.

FLASH BURN: A burn caused by excessive exposure of bare skin to thermal radiation.

FREE AIR OVERPRESSURE: The unreflected pressure, in excess of the ambient atmospheric pressure, created in the air by the blast wave from an explosion.

FUSION: A process whereby the nuclei of light elements, especially those of the hydrogen isotopes, e.g., deuterium and tritium, combine to form the nucleus of a heavier element with the release of substantial amounts of energy. This process provides the energy for hydrogen bombs.

GAMMA RAYS: Electromagnetic radiations of high energy originating in atomic nuclei and accompanying many nuclear reactions, e.g., fission, radioactivity, and neutron capture. Physically, they are identical with X-rays of high energy; the only difference is that X-rays do not originate from atomic nuclei, but are produced in other ways, e.g., by slowing down electrons of high energy.

GEIGER COUNTER: A device used to detect radiation by collecting and observing the pulse of ions created in an enclosed sample of gas by the passage of energetic particles.

GENES: The basic hereditary units which singly or in combination determine heritable character. Located at certain specific points along the chromosomes.

GONADS: The male and female glands in which the reproductive cells are formed, i.e., the testes and ovaries.

GRAM: A unit of mass commonly used in scientific work; very nearly the mass of one cubic centimeter of water, or about one thousandth of a quart.

GROUND ZERO: The point on the surface of land or water vertically below or above the center of a burst of a nuclear weapon; frequently abbreviated to GZ. For a burst over or under water, the term surface zero should preferably be used.

GUN-TYPE WEAPON: A device in which two or more pieces of fissionable material, each less than a critical mass, are brought together very rapidly so as to form a supercritical mass which can explode as the result of a rapidly expanding fission chain.

HALF-LIFE: The time required for the activity of a given radioactive species to decrease to half of its initial value because of radioactive decay. A characteristic property of each radioactive species and is independent of its amount or condition.

HALF-VALUE LAYER THICKNESS: The thickness of a given material which will absorb half the gamma radiation incident upon it. Depends on the nature of the material, on the energy of the gamma rays, and is roughly inversely proportional to its density.

HEAVY WATER: Water in which hydrogen has been replaced by its heavier isotope deuterium.

HEIGHT OF BURST: The height above the earth's surface at which a bomb is detonated in the air.

HOT SPOT: The region in a contaminated area in which the level of radioactive contamination is somewhat greater than in neighboring regions in the area.

HYDROGEN BOMB: A bomb in which all or part of the energy derives from the fusion process. The energy ranges from hundreds of thousands to millions of tons of TNT equivalent.

HYPOCENTER: A term sometimes used for ground zero.

IMPLOSION WEAPONS: A device in which a quantity of fissionable material, less than a critical mass, has its volume suddenly decreased by compression so that it becomes supercritical, and an explosion can take place. Compression is achieved by means of a spherical arrangement of specially fabricated shapes of ordinary high explosives which produce an inwardly-directed implosion wave, the fissionable material being at the center of the sphere.

IMPULSE: The product of the overpressure from the blast wave of an explosion, and the time during which it acts at a given point. An integral, with respect to time, of the overpressure, the integration being between the time of arrival of the blast wave, and that at which the overpressure returns to zero at a given point.

INDUCED RADIOACTIVITY: Radioactivity produced in certain materials as a result of nuclear reactions, particularly the capture of neutrons, which are accompanied by the formation of unstable nuclei. The activity induced by neutrons from a nuclear explosion in materials containing the elements sodium, manganese, silicon, or aluminum may be significant.

INITIAL NUCLEAR RADIATION: Nuclear radiation emitted from the ball of fire and the cloud column during the first minute after a nuclear explosion. The time limit of one minute is set as that required for the source of radiations to attain such a height that only insignificant amounts reach the earth's surface.

INTENSITY: The energy of any radiation incident upon unit area, perpendicular to the radiation beam, in unit time. Intensity of thermal radiation is expressed in calories per square cm/sec., falling on a given surface at any specified instant. As applied to nuclear radiation, the term is sometimes used to express the exposure dose rate at a given location, e.g., in roentgens or milliroentgens per hour.

INTERNAL RADIATION: Nuclear radiation resulting from radioactive substances in the body. Important sources are iodine-131 in the thyroid gland, and strontium-90 and plutonium-239 in the bone.

INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION (ICRP): An international body of radiologists which recommends tolerance levels, safety practices, etc.

ION: A positively charged atom from which an electron has been separated.

IONIZATION: A process in which an electron is separated from a neutral atom by force of attraction or repulsion exerted on it by a passing charged particle.

IONIZING RADIATION: Electromagnetic radiation or particulate radiation capable of producing ions, i.e., electrically charged particles, directly or indirectly in its passage through matter.

ISOTOPE: A form of the same element having identical chemical properties but differing in the atomic masses and in nuclear properties, e.g., radioactivity, fission, etc.

KERATOCONJUNCTIVITIS: An inflammation of cornea; if it becomes epidemic, it is called acute conjunctivae, generally causing swelling in the nose area.

KILO: A prefix meaning one thousand.

KILOTON: A measure of nuclear weapon energy. A one-kiloton weapon releases the same amount of energy as would 1,000 tons of TNT.

KILOTON ENERGY: Energy of a nuclear explosion equivalent to that produced by the explosion of one kiloton of TNT, i.e., 10^{12} calories or 4.2×10^9 ergs.

LD-50: See median lethal dose.

LEUKEMIA: A malignant blood disease in which the white blood cells are produced in excess.

LOADING: The force on an object or structure or element of a structure. Loading because of a blast is equivalent to the net pressure in excess of the ambient value multiplied by the area of the loaded object, etc.

MACH FRONT: See Mach stem.

MACH REGION: The region on the surface at which the Mach stem has formed as a result of a particular explosion in the air.

MACH STEM: The shock front or Mach front formed by the fusion of the incident and reflected shock fronts from an explosion. Generally used with reference to a blast wave, propagated in the air, reflected at the surface of the earth. It is nearly perpendicular to the reflecting surface and presents a slightly convex front.

MAXIMUM PERMISSIBLE CONCENTRATION (MPC): The maximum concentration of a radioactive isotope considered safe for any individual.

MEDIAN LETHAL DOSE (LD-50): The amount of ionizing radiation exposure over the whole body which is expected to be fatal to 50% of a large group of living creatures or organisms. A dose of about 450 roentgens, received over the whole body in the course of a few hours or less is the median lethal dose for human beings.

MEGA: A prefix meaning million (10^6); thus, a megacurie is a million curies.

MEGATON ENERGY: The energy of a nuclear explosion equivalent to 1,000,000 tons or 1,000 kilotons of TNT.

MEV: A million electron volts; a unit of energy commonly used in nuclear physics, equivalent to 1.6×10^{-6} erg. About 200 Mev of energy are produced for every nucleus that undergoes fission.

MICRO: A prefix meaning one millionth.

MICROCURIE (MCCURIE): One millionth of one curie.

MICROMICRO: A prefix meaning a millionth of a millionth.

MICROMICROCURIE (MCMCCURIE): One millionth of one millionth of a curie.

MILLI: A prefix meaning one thousandth.

MILLICURIE (MCURIE): One thousandth of one curie.

MILLIRAD: One thousandth of a rad.

MILLIREM: One thousandth of a rem.

MILLIROENTGEN: One thousandth of a roentgen.

MONITORING: A procedure or operation of locating and measuring radioactive contamination by means of survey instruments which can detect and measure ionizing radiations.

MUTATION: A transformation of a gene which alters its heritable character; can be induced by radiation.

NATIONAL EMERGENCY ALARM REPEATER (NEAR): A home warning system still under study. A 240-cycle signal carried on regular 110-volt power lines would set small buzzers, plugged into alternating current outlets, squawking. NEAR units can be installed in each home for a few dollars, might give warning to all within one minute after the discovery of an oncoming attack.

NATIONAL WARNING SYSTEM (NAWAS): A civil defense warning network, controlled from North American Defense Command headquarters in Colorado Springs, linking 449 cities, military bases, and other defense points by 45,000 miles of telephone lines and microwave radio circuits.

NEUTRON: A neutral particle, i.e., with no electrical charge of about unit mass, present in all atomic nuclei, except those of ordinary hydrogen. Is required to initiate the fission process, and large numbers of neutrons are produced by both fission and fusion reactions in nuclear explosions.

NEVADA TEST SITE: An area within the continental United States used for nuclear tests. Located north-west of Las Vegas, Nevada, within the boundaries of Las Vegas Bombing and Gunnery Range.

NITRO: A combining form, chemically denoting certain compounds of nitrogen or of its acids.

NOMINAL ATOMIC BOMB: Formerly described an atomic weapon with an energy release equivalent to 20 kilotons of TNT. Used over Japan and in the Bikini tests in 1946.

NUCLEAR RADIATION: Particulate and electromagnetic radiation emitted from atomic nuclei in various nuclear processes. The important nuclear radiations are alpha and beta particles, gamma rays, and neutrons. All nuclear radiations are ionizing radiations, but the reverse is not true. X-rays are included among ionizing radiations, but they are not nuclear radiations since they do not originate from atomic nuclei.

NUCLEAR REACTOR: A device in which a controlled chain reaction takes place in fissionable material. Control is usually through rods of neutrons - the absorbing materials.

NUCLEAR TESTS: Tests carried out either at Nevada Test Site, or at Eniwetok Proving Grounds to supply information required for design and improvement of nuclear weapons, and to study the phenomena and effects associated with nuclear explosions.

NUCLEAR WEAPON: A general name given to any weapon in which the explosion results from the energy released by reactions involving atomic nuclei, either fission or fusion, or both.

NUCLEON: A proton or a neutron.

NUCLEUS: A small, central, positively charged region of an atom which carries essentially all the mass. It is the solid part of the atom of the order of 10^{-12} cm. Except for nucleus of hydrogen, all atomic nuclei contain both protons and neutrons. The number of protons determines the total positive charge or atomic number - same for all atomic nuclei of a given chemical element. The total number of neutrons and protons, called the mass number, is closely related to the mass of the atom.

NUCLIDE: A nuclear species, a specific isotope.

OPACITY: The quality or state of a body which renders it impervious to rays of light.

OVERPRESSURE: The transient pressure, usually expressed in pounds per square inch, exceeding the ambient pressure, manifested in the shock wave from an explosion. Variation of the overpressure with time depends on the energy yield of the explosion, distance from the point of burst, and medium in which the weapon is detonated. Peak overpressure is the maximum value of the overpressure at a given location, and is generally experienced at the instant the shock wave reaches that location.

PACIFIC PROVING GROUNDS: See Eniwetok Proving Grounds.

PEAK OVERPRESSURE: See overpressure.

PLASTIC RANGE: The stress range in which a material will not fail when subjected to the action of a force, but will not recover completely, so that a permanent deformation results, when the force is removed.

PLUME: See column.

PLUTONIUM: One of the very heavy elements, atomic number being 94. Plutonium-239 is used as a fissionable material in nuclear weapons.

POSITRON: A positive particle emitted by proton-rich nuclei. It has the same mass as the electron and a charge equal in magnitude, but positive.

POTASSIUM-40: A radioactive isotope which emits a 1.3 Mev beta particle and gamma rays. It has a half-life of 1.3×10^9 years.

PRIMARY GROUP: A face-to-face organization of individuals who cooperate for certain common ends, share many ideals and ways of behaving, have confidence in, and at least some degree of affection for each other, and are aware of their similarity and bond of association, e.g., a family, a clan, a small club.

PROTON: A particle of mass unity carrying a unit positive charge; identical physically with the nucleus of the ordinary hydrogen atom. All atomic nuclei contain protons.

PSI: See overpressure.

RAD: A unit of absorbed dose of radiation; represents the absorption of 100 erg of nuclear radiation per gram of the absorbing material or tissue.

RADIATION: Act or process of radiation; the process by which energy is emitted from molecules and atoms owing to internal changes.

RADIOACTIVITY: A spontaneous emission of radiation, generally alpha or beta particles, often accompanied by gamma rays, from the nuclei of an isotope. As a result of this emission, radioactive isotope is converted into the isotope of a different element which may also be radioactive. As a result of one or more stages of radioactive decay, a stable end product is formed which is nonradioactive.

RATEMETER: An instrument similar to dosimeter, except it indicates the rate at which the radiation is being absorbed by a person.

RELATIVE BIOLOGICAL EFFECTIVENESS (RBE): The ratio of the number of rads of gamma or X-radiation of a certain energy which will produce a specified biological effect to the number of rads of another radiation required to produce the same effect is RBE of the latter radiation.

REFLECTED PRESSURE: The total pressure which results instantaneously at the surface when a shock wave traveling in one medium strikes another.

REM: A unit of biological dose of radiation; the name is derived from the initial letters of the term "roentgen equivalent man or mammal." The number of rems of radiation is equal to the number of rads absorbed, multiplied by the RBE of the given radiation.

REP: A unit of absorbed dose of radiation; the name is derived from the initial letters of the term "roentgen equivalent physical." Basically, it is intended to express the amount of energy absorbed per gram of soft tissue as a result of exposure to 1 roentgen of gamma or X radiation, estimated to be about 97 ergs. Generally defined as the dose of any ionizing radiation resulting in the absorption of 97 ergs of energy per gram of soft tissue.

RESIDUAL NUCLEAR RADIATION: Nuclear radiation, mainly beta particles and gamma rays, which persists for some time following a nuclear explosion. Radiation is emitted by the fission products and other bomb residues in the fallout, and to some extent by earth and water constituents, and other materials, in which radioactivity has been induced by the capture of neutrons.

ROENTGEN: A unit of exposure dose of gamma or X radiation. Defined as the quantity of gamma or X radiation such that the associated corpuscular emission per 0.001293 gram of air produces in air ions carrying one electrostatic unit quantity of electricity of either sign. One roentgen of gamma or X radiation can result in the absorption of 87 ergs of energy per gram of air.

ROLE CONFLICT: A situation in which a person is expected to play two roles which, it seems to him, cannot be harmonized.

SCALING LAW: A mathematical relationship which permits the effects of a nuclear explosion of given energy yield to be determined as a function of distance from the explosion, provided the corresponding effect is known as a function of distance for a reference explosion, e.g., of one kiloton energy yield.

SCATTERING: The diversion of radiation, either thermal or nuclear, from its original path as a result of interactions with atoms, molecules, or larger particles in the atmosphere or other medium between the source of radiations, e.g., a nuclear explosion and a point at some distance away. As a result of scattering, radiations, especially gamma rays and neutrons, will be received at such a point from many directions instead of only from the direction of the source.

SECONDARY GROUP: Any group not having close or intimate ties, as in a primary group, but possessing some common interest or similarity.

SHEAR WALL: A wall designed to take a load in the direction of the plane of the wall, as distinct from lateral loads perpendicular to the wall. May be designed to take lateral loads as well.

SHIELDING: Any material or obstruction which absorbs radiation and thus tends to protect personnel or materials from the effects of a nuclear explosion. A moderately thick layer of any opaque material will provide satisfactory shielding from thermal radiation, but a considerable thickness of material of high density may be needed for nuclear radiation shielding.

SHOCK FRONT: A fairly sharp boundary between the pressure disturbance created by an explosion and the ambient atmosphere, water or earth, constituting the front of the shock wave.

SHOCK WAVE: A continuously propagated pressure pulse in surrounding medium which may be air, water, or earth, initiated by the expansion of the hot gases produced by an explosion. It has two phases. During the positive phase, the pressure rises very sharply to a value that is higher than ambient, and then decreases rapidly to the ambient pressure. Duration of this phase increases and the maximum pressure decreases with increasing distance from an explosion of given energy yield. In the second or negative phase, the pressure falls below ambient and then returns to the ambient value. Duration of this phase is approximately constant throughout the blast wave history and may be several times in duration of positive phase.

SLANT RANGE: The distance from a given location, usually on the earth's surface, to the point at which the explosion occurred.

SLICK: The trace of an advancing shock wave seen on the surface of reasonably calm water, as a circle of rapidly increasing size apparently whiter than the surrounding water, observed particularly following an underwater explosion.

SOMATIC: Pertaining to all tissues other than the reproductive cells. Somatic effects are limited to the irradiated organism itself and do not carry over to succeeding generations.

STRATOSPHERE: The portion of the atmosphere above the troposphere, where temperature changes but little with altitude, and clouds of water vapor never form.

STRONTIUM: The element of atomic number 38. Strontium-90, one of its radioactive isotopes, emits a 0.61 Mev beta particle and has a half-life of 28 years.

STRONTIUM UNIT: A measure of the concentration of strontium-90 in food and in body, i.e., the bone. Concentration is measured as the ratio of strontium to calcium, the chemical cousin with which strontium becomes mixed in soil and living tissue. One strontium unit is one micromicrocurie of strontium-90 per gram of calcium.

SUPERCritical: A term used to describe the state of a given fission system when quantity of fissionable material is greater than the critical mass under the existing conditions. A highly supercritical system is essential for the production of energy at a very rapid rate so that an explosion may occur.

SURFACE BURST: An explosion of a nuclear weapon at the surface of the land or water or at a height above the surface less than the radius of the fireball at maximum luminosity (in the second thermal pulse). An explosion in which the bomb is detonated actually on the surface is called a contact surface burst or a true surface burst.

SURFACE ZERO: See ground zero.

SURVEY METER: A portable instrument, e.g., as a Geiger counter or ionization chamber, used to detect nuclear radiation and to measure the dose rate.

SYNDROME RADIATION: The complex of symptoms characterizing the disease known as radiation sickness, resulting from excessive exposure of the whole body to ionizing radiation. Earliest symptoms are: nausea, vomiting, and diarrhea, which may be followed by loss of hair (epilation), hemorrhage, inflammation of mouth and throat, and general loss of energy. In severe cases, where the radiation exposure has been relatively large, death may occur within 2-4 weeks. Those who survive six weeks after the receipt of a single dose of radiation may generally be expected to recover.

THERMAL ENERGY: Energy emitted from the ball of fire as thermal radiation. The total amount of thermal energy received per unit area at a specified distance from a nuclear explosion is generally expressed in terms of calories per square cm.

THERMAL ENERGY YIELD: A part of the total energy yield of the nuclear explosion radiated as thermal energy. It is one-third of the total energy of explosion, and may be expressed in calories, ergs, or in terms of the TNT required.

THERMAL RADIATION: Electromagnetic radiation emitted from the ball of fire as a consequence of its very high temperature; consists of ultraviolet, visible, and infrared radiations. In early stages, when temperature of the fireball is extremely high, ultraviolet radiation predominates; in the second pulse, temperatures are lower, and most of the thermal radiation lies in the visible and infrared regions of the spectrum.

THERMONUCLEAR: An adjective referring to the process in which very high temperatures are used to bring about the fusion of light nuclei, e.g., those of the hydrogen isotopes, deuterium and tritium, with the accompanying liberation of energy.

THRESHOLD DETECTOR: An element or isotope in which radioactivity is induced only by the capture of neutrons having energies in excess of a certain threshold value characteristic of the element or isotope. They are used to determine the neutron spectrum from a nuclear explosion, i.e., the numbers of neutrons in various energy ranges.

TNT EQUIVALENT: A measure of the energy released in the detonation of a nuclear weapon or in explosion of a given quantity of fissionable material, expressed in terms of quantity of TNT which would release the same amount of energy when exploded. The TNT equivalent is usually stated in kilotons or megatons. The basis of it is that the explosion of one ton of TNT releases 10^9 calories of energy.

TOLUENE: A hydrocarbon of the aromatic series, obtained chiefly from coke-oven vapors and by distillation of coal tar; used in the manufacture of dyes and other components.

TOLUOL: Toluene, especially in a crude commercial form.

TRANSMITTANCE: The fraction or percentage of the thermal energy received at a given location after passage through the atmosphere relative to that which would have been received at the same location if no atmosphere were present.

TRI: A combining form. Chemically means the presence of three atoms, groups, or equivalents of that signified by the term to which it is prefixed.

TRINITROTOLUOL (TNT): A conventional explosive used as a referent for describing the energy yield of a nuclear bomb.

TRIPLE POINT: An intersection of the incident, reflected and fused shock fronts accompanying an air burst. The height of the triple point above the surface, i.e., the height of the Mach stem, increases with increasing distance from a given explosion.

TRITIUM: A radioactive isotope of hydrogen, with two neutrons and a proton in its nucleus, having a mass of 3 units produced in nuclear reactors by the action of neutrons on lithium nuclei. It emits a beta particle with a maximum energy of 18,000 electron volts and has a half-life of 12.3 years.

TROPOPAUSE: The imaginary boundary between stratosphere and troposphere. In middle latitudes its height is about 30,000 to 40,000 feet; in the tropics, 50,000 to 60,000 feet above the earth's surface. The height depends somewhat on the season.

TRUE SURFACE BURST: See surface burst.

2W CONCEPT: A concept that the explosion of a weapon of energy yield W on the earth's surface produces blast phenomena identical to those produced by a weapon of twice the yield, i.e., 2W, burst in free air (away from any reflecting surface).

UNDERGROUND BURST: The explosion of a nuclear weapon with its center beneath the surface of the ground.

UNDERWATER BURST: The explosion of a nuclear weapon with its center beneath the surface of the water.

URANIUM: The element of atomic number 92. The common isotope, uranium-238, emits an alpha particle of 4.2 Mev, has a half-life of 4.5×10^9 years. Natural uranium is 99.3% uranium-238 and 0.7% uranium-235.

VISIBILITY RANGE: A horizontal distance at which a large dark object can just be seen against the horizon sky in daylight. Visibility is related to the clarity of atmosphere, ranging from more than 30 miles for an exceptionally clear atmosphere to less than a mile for dense haze or fog.

X-RAYS: Artificially produced radiation similar to gamma rays. Its penetrating power depends on the energy of the rays, which ranges from tens of thousands to hundreds of thousands of electron volts.

YIELD: Total effective energy released in a nuclear explosion. Usually expressed in terms of the equivalent tonnage of TNT required to produce the same energy release in an explosion. The total energy yield is manifested as nuclear radiation, thermal radiation, and shock energy, the actual distribution being dependent upon the medium in which the explosion occurs and also upon the type of weapon, and the time after detonation.